Stillaguamish Shellfish Protection Program

FINAL March 1, 2011

Snohomish County
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Surface Water Management
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Recommended citation:
Snohomish County. 2011. Stillaguamish Shellfish Protection Program. Snohomish County Public Works, Surface Water Management. Everett, WA.

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Acknowledgements

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Acronyms

BAS: best available science
BMP: best management practice
BNR: biological nutrient removal
cfu: coliform forming unit
CWD: Stillaguamish River Clean Water District
C&S: ceremonial and subsistence
DD: drainage district
DNA: deoxyribonucleic acid
EWS: Early Warning System
GMA: Growth Management Act
gpd: gallons per day
IDDE: Illicit Discharge Detection and Elimination
MS4: municipal separate storm sewer system
mL: milliliter
MPN: most probable number
MRC: marine resources committee
NPDES: National Pollutant Discharge Elimination System
OSS: on-site septic system
PSI: Pacific Shellfish Institute
RCW: Revised Code of Washington
SBR: sequencing batch reactor
SCD: Snohomish Conservation District
SCHA: Snohomish County Housing Authority
SHD: Snohomish Health District
SWM: Snohomish County Public Works, Surface Water Management
TCF: Twin City Foods
TMDL: Total Maximum Daily Load
U&A: usual and accustomed
WAC: Washington Administrative Code
WBCC: Warm Beach Christian Camps and Conference Center
WDOE: Washington Department of Ecology

WDOH: Washington Department of Health

WSDA: Washington State Department of Agriculture

WDFW: Washington Department of Fish and Wildlife

WWTP: wastewater treatment plant

Executive Summary

Snohomish County developed this Stillaguamish Shellfish Protection Program (shellfish program) with input from stakeholders to guide and focus the continuing work of the County and its partners to improve water quality over shellfish tidelands and foster self-sustaining and harvestable populations of shellfish adjacent to the Stillaguamish River Clean Water District (CWD). These shellfish tidelands are located in South Skagit Bay and Port Susan. Stakeholder input was primarily provided by a steering committee that met monthly with Snohomish County staff from February through June of 2009. Additional input was invited from other stakeholders who were not able to participate in the steering committee. This shellfish program was finalized in June 2010 after review and input by the CWD Advisory Board.[1]

The Washington Department of Health closed 18,040 acres of commercial shellfish growing area in South Skagit Bay and Port Susan in the late 1980s in response to bacterial water pollution in the marine waters influenced by the Stillaguamish River and South Fork Skagit River. This closure comprised 35% of all Washington State shellfish growing area closures between 1981 and 2008 (WDOH 2009). Snohomish County made water quality and shellfish protection in this area a priority by establishing the CWD in 1993 using, in part, the authority of Revised Code of Washington (RCW) Chapter 90.72, which allows local governments to create *shellfish protection districts* and collect fees to pay for shellfish protection activities. One of the goals of the CWD is to "Restore water quality in saltwater tidelands to allow the upgrading of conditionally approved, restricted, and prohibited shellfish beds." This shellfish program addresses Snohomish County's shellfish protection goal for the CWD.

Over the past two decades Snohomish County and many other watershed partner agencies have conducted extensive bacterial water quality monitoring, pollution control, and public education activities in the Stillaguamish River watershed. Similar water quality activities have also been implemented in neighboring Skagit and Island counties.

In recent years much progress has been made on improving local bacterial water quality conditions in and around the CWD. These improvements have allowed the Washington Department of Health to upgrade the South Skagit Bay and Port Susan commercial shellfish growing areas. In 2009 the South Skagit Bay shellfish area was expanded from 1,350 acres to 2,200 acres. And on April 2, 2010, 1,800 acres of the Port Susan shellfish area were upgraded in response to marine water quality improvements detected by the Stillaguamish Tribe's monitoring program. Ambient water quality monitoring by Snohomish County and the Washington Department of Ecology has also detected improving freshwater quality conditions in the Stillaguamish River.

[1] The CWD Advisory Board is a diverse stakeholder group appointed by the Snohomish County Council to make annual recommendations on the annual work programs and budgets of the Surface Water Management Division of the Public Works Department and any other agencies that receive CWD revenues.

Although it is nearly impossible to show a direct causative link between local water quality cleanup efforts and the recent improvements in water quality over the shellfish growing areas in South Skagit Bay and Port Susan, much of the progress is generally attributed to improvements in dairy farm waste management, on-site septic system maintenance, and wastewater treatment plant upgrades. However, much of the remaining bacterial pollution is assumed to be from persistent non-point sources, including on-site septic systems (OSS) that have not been maintained, pet waste, livestock, and possibly from the large population of snow geese that overwinter in the lower Stillaguamish River floodplain and estuary.

This shellfish program recognizes that we have made significant progress over the past two decades to clean up water quality for the purpose of upgrading local shellfish growing areas. It also highlights the importance of maintaining these improved water quality conditions while expanding our efforts to upgrade additional shellfish areas that remain closed to harvest. Snohomish County, Washington State, cities, tribes, and private landowners have different responsibilities for this work. Snohomish County is responsible for water quality protection within the CWD, but the CWD does not include tidelands, the cities, or the Stillaguamish River Flood Control District. Snohomish County strives to work with these other local jurisdictions to coordinate our respective work programs for the protection of the South Skagit Bay and Port Susan commercial shellfish growing areas.

Snohomish County also recognizes the roles of Washington State and the tribes as co-managers of the shellfish resource. The State and the tribes are the responsible agencies for fostering self-sustaining and harvestable shellfish populations. Private tideland owners and non-tribal commercial shellfish harvesters also have a role to play in shellfish resource management.

Native American tribes and one non-tribal commercial shellfish company are the primary shellfish harvest stakeholders for shellfish growing areas adjacent to the CWD. The Tulalip Tribes and the Swinomish Tribe have legally recognized shellfish harvest rights in Port Susan and are actively co-managing shellfish resources throughout their legally recognized fishing areas. The Swinomish and Upper Skagit tribes have shellfish harvest rights in South Skagit Bay, but are not actively harvesting in that area. The Stillaguamish Tribe does not have clear, legally recognized shellfish harvest rights, but is interested in harvesting Port Susan shellfish in the future. Tribes harvest shellfish in Puget Sound for commercial as well as for ceremonial and subsistence purposes.

Trans Ocean Seafoods, a non-tribal commercial shellfish company, has been harvesting hundreds of thousands of pounds of Eastern soft shell clams for the past decade in South Skagit Bay. The clams are exported to the East Coast where they are used in a variety of ways, including clam chowder.

Non-tribal recreational shellfish harvest adjacent to the CWD is limited to private tidelands between Warm Beach and Kayak Point. The only public shellfish tideland adjacent to the CWD with public access is at Kayak Point Regional County Park, but

clam harvest in that area is closed because the local little neck clam population is severely depressed and is not showing signs of recovery despite the closure.

While it is important for Snohomish County to understand who owns the tidelands and who is responsible for shellfish resource management, the County's responsibility is limited to upland land use management and water quality protection in unincorporated parts of the CWD. Nevertheless, Snohomish County also has an interest in working cooperatively with its Stillaguamish watershed partners and shellfish stakeholders to protect and restore shellfish resources as part of the regional effort to sustainably manage the Puget Sound ecosystem. In this spirit of cooperation, Snohomish County has developed this shellfish program, which includes specific goals, objectives, and actions for implementation by the County and its partners.

This shellfish program has four main goals:
Goal 1: Reduce Bacterial Pollution Affecting Shellfish Areas
Goal 2: Foster Self-Sustaining and Harvestable Populations of Shellfish
Goal 3: Raise Public Awareness about Status and Trends of Water Quality and Shellfish
Goal 4: Adaptively Manage Work Programs to Achieve Shellfish Protection Goals

For more details on the objectives of each goal and the actions for achieving each objective, see section 3 of the shellfish program report.

The key performance measure of the Shellfish Program is the annual classification status of the South Skagit Bay and Port Susan commercial shellfish growing areas. As of April 2010, both shellfish areas were classified as "Approved." Since this is the best possible commercial shellfish classification it is important to preserve it and avoid future downgrading or closures.

In the spring of 2009 the Snohomish County Prosecuting Attorney's Office advised that this shellfish program and annual reporting are required by RCW 90.72. Per that requirement, Snohomish County will submit to the Washington Department of Health, Office of Shellfish and Water Protection this shellfish program along with an annual report summarizing the County's use of CWD revenues collected under the authority of RCW 90.72. Beginning in 2011 the County will annually review and update this shellfish program with local stakeholders.

Through this collaborative shellfish protection effort Snohomish County can help to protect the water quality improvements that have been achieved over the past two decades and further expand the shellfish growing areas in tidelands adjacent to the CWD. Marine waters approved for shellfish harvest exceed the water quality standards for swimming and fishing. Therefore, maintaining harvestable shellfish tidelands and clean water produces important quality of life benefits and economic opportunities to the people of Snohomish County.

1. Purpose and Background

The purpose of this Stillaguamish Shellfish Protection Program (shellfish program) is to define goals, objectives, and actions for bivalve shellfish harvest protection within the Stillaguamish River Clean Water District (CWD). Until recently, on-going problems with upland freshwater bacterial pollution contaminating the marine waters at the mouth of the Stillaguamish River have led to restrictions by the Washington Department of Health on commercial shellfish harvest in South Skagit Bay and Port Susan. Snohomish County made water quality and shellfish protection in this area a priority by establishing the CWD in 1993 using, in part, the authority of Revised Code of Washington (RCW) Chapter 90.72, which allows local governments to create shellfish protection districts. The CWD is one of seventeen shellfish protection districts in the Puget Sound region (Sullivan 2009). One of the goals of the CWD is to "Restore water quality in saltwater tidelands to allow the upgrading of conditionally approved, restricted, and prohibited shellfish beds."

This shellfish program defines four shellfish protection goals:
1. Improve bacterial water quality to allow shellfish growing areas adjacent to the CWD in South Skagit Bay and Port Susan to be opened and maintained for commercial, tribal, and recreational harvest.
2. Foster self-sustaining and harvestable populations of shellfish adjacent to the CWD.
3. Raise public awareness about the status and trends of water quality and shellfish in and adjacent to the CWD.
4. Monitor progress and adaptively manage work programs to achieve the goals listed above.

Snohomish County Surface Water Management (SWM) developed this shellfish program in cooperation with the CWD Advisory Board, Snohomish Conservation District, Snohomish Health District, Washington Department of Health, Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Agriculture, Stillaguamish and Tulalip Tribes, Warm Beach Christian Camp, and various other stakeholders. This shellfish planning effort was recommended in 2007 by the CWD Advisory Board. In 2008, Snohomish County initiated a shellfish restoration planning process with funding support from a local government stormwater grant provided by the Washington Department of Ecology (Stormwater Grant G0800241).

Freshwater and marine waters in neighboring Skagit County and Island County that influence water quality over the shellfish beds in South Skagit Bay and Port Susan are also of concern. However, this shellfish program primarily focuses on activities within Snohomish County's jurisdictional boundaries and, specifically, areas within the Stillaguamish River CWD, and therefore it includes limited information on pollution sources and corrective actions needed in Skagit and Island counties. Snohomish County will continue to coordinate with Skagit and Island counties as part of the adaptive management process for this shellfish program.

Stillaguamish River Clean Water District (CWD)

Snohomish County established the CWD through approval of Snohomish County Code Title 25A in 1993 based on a combination of the shellfish protection district provisions of RCW 90.72 and the stormwater control provisions of RCW 36.89. The CWD boundary was expanded in 2004. The CWD now includes the unincorporated area of Snohomish County within the Stillaguamish River watershed, the Seven Lakes area north of the Tulalip Reservation, and the Skagit Flats area north of Stanwood up to the Skagit County border. The CWD does not include the cities of Stanwood, Arlington, and Granite Falls. The CWD also does not include the Stillaguamish River Flood Control district. See Figure 1 below for a map of the CWD.

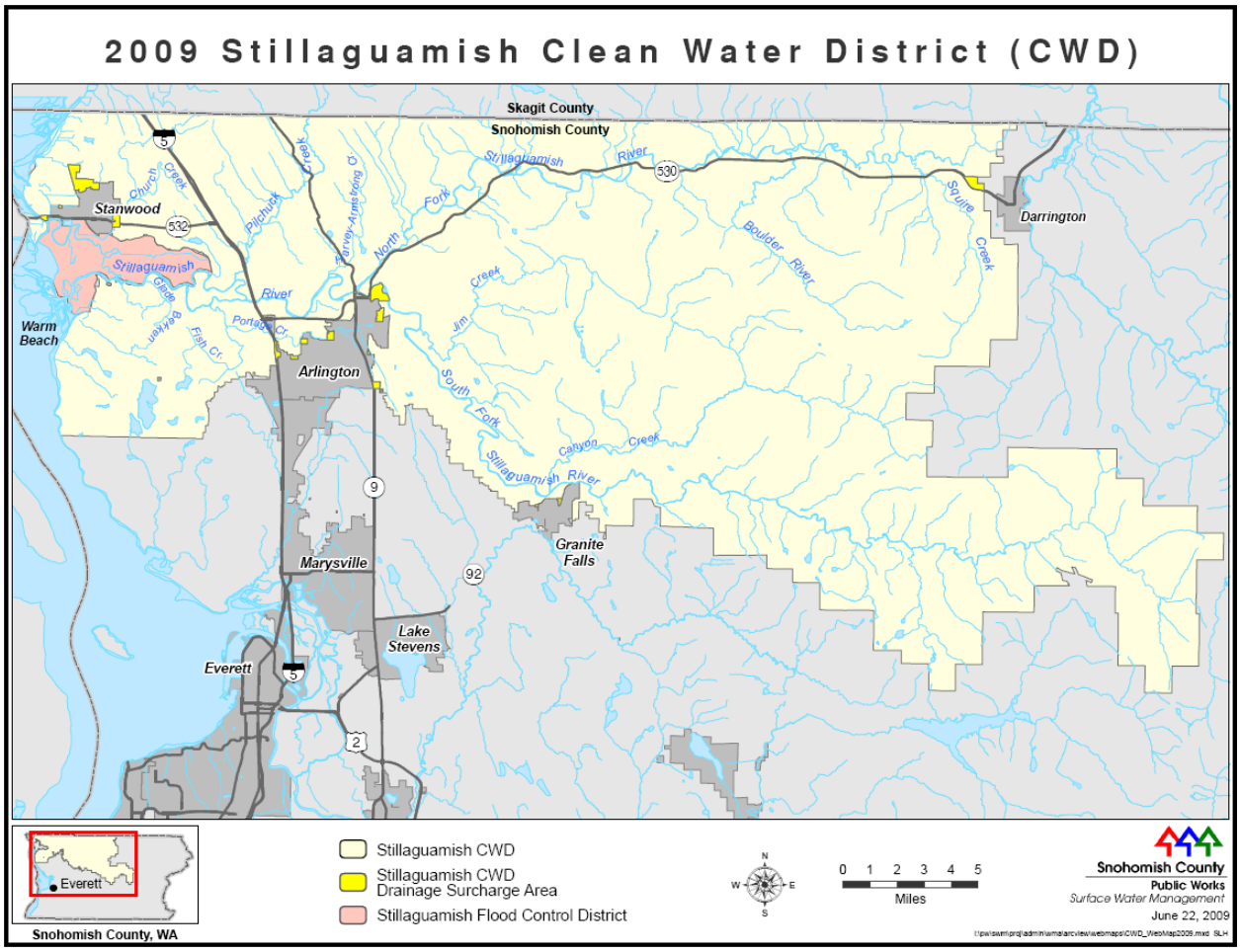

Figure 1: Stillaguamish River Clean Water District.

Among the stated purposes of Snohomish County Code Title 25A is a provision to "Restore water quality in saltwater tidelands to allow the upgrading of conditionally approved, restricted and prohibited shellfish beds."[2] The establishment of the CWD provides authority to collect service charges to achieve the goals and fulfill the duties of Title 25A. The CWD serves as a mechanism to fund projects that enhance water quality, water quantity, and aquatic habitat in the Clean Water District. The projected

[2] Snohomish County Code 25A.05.010(4)

CWD revenue for 2010 is about $2.2 million and about $620,000 of that total is collected under the shellfish protection district authority of RCW 90.72.[3]

RCW 90.72 requires counties to create shellfish protection districts and develop shellfish protection programs in response to downgrades in the classification of shellfish growing areas due to nonpoint pollution. Shellfish protection programs define actions to address the causes or suspected causes of bacterial pollution. The shellfish growing areas in South Skagit Bay and Port Susan were downgraded and closed before this requirement was established. Snohomish County voluntarily created the CWD in 1993, but never developed a shellfish protection program. However, in 2009 the Snohomish County Prosecuting Attorney concluded that the County is still obligated to have a shellfish protection program and submit annual reports to the Washington Department of Health documenting the County's shellfish protection program and expenditure of revenues collected under the authority of RCW 90.72.

Shellfish Classification in South Skagit Bay and Port Susan

In recent years much progress has been made on improving local bacterial water quality conditions in and around the CWD. These improvements are exemplified by the Washington Department of Health upgrades of the South Skagit Bay and Port Susan commercial shellfish growing areas. In 2009 the Approved South Skagit Bay shellfish area was expanded from 1,350 acres to 2,200 acres. Then on April 2, 2010, 1,800 acres of the Port Susan shellfish area were upgraded from Unclassified to Approved in response to marine water quality improvements detected by the Stillaguamish Tribe monitoring program. Ambient water quality monitoring by Snohomish County and the Washington Department of Ecology has also detected improving freshwater quality conditions in the Stillaguamish River. The 2010 status of commercial shellfish growing areas within the tide flats of South Skagit Bay and Port Susan adjacent to the CWD is shown in Figure 2 below.

Commercial shellfish growing areas are classified by the Washington Department of Health, Office of Shellfish and Water Protection, in response to formal requests from certified commercial shellfish harvesters or tribes. Shellfish growing areas are classified as *Approved*, *Conditionally Approved*, *Restricted*, or *Prohibited*. Washington Department of Health shellfish classification decisions are based on the findings and recommendations of evaluations called *shellfish sanitary surveys*, which synthesize shoreline surveys of pollution sources, marine water sampling data, and analyses of environmental factors that may distribute pollution in the area. See Appendix A for definitions of shellfish growing area classifications and an explanation of the evaluation process. For most shellfish growing areas, bacterial pollution is the primary type of pollution of concern.

[3] For more information about the CWD, see the *State of the Stilly Report* (Snohomish County 2007) and the Snohomish County web site at http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Work_Areas/Water_Quality/CWD/default.htm.

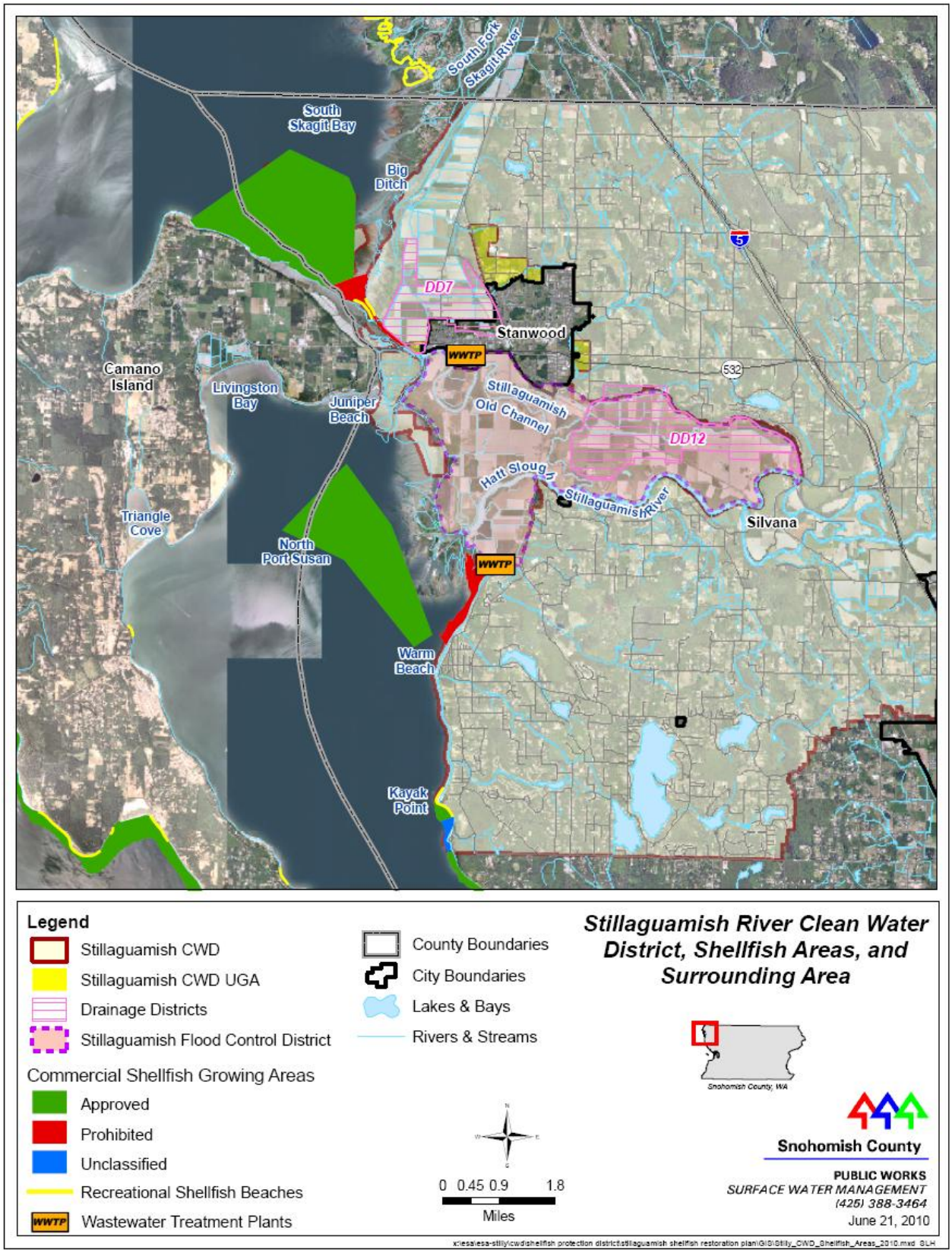

Figure 2: Shellfish Growing Areas Adjacent to the Clean Water District

In 1987 the 6,140-acre South Skagit Bay commercial shellfish growing area was downgraded from Approved to Restricted (WDOH 2009). In 1993 2,280 acres were upgraded from Restricted to Conditionally Approved. In 2006 the South Skagit Bay growing area was upgraded from Conditionally Approved to Approved, but reduced in size to 1,344 acres. Most recently, as noted above, the South Skagit Bay shellfish growing area was expanded in 2009 to 2,200 acres. Despite these recent upgrades, South Skagit Bay has been identified as a *threatened shellfish area* every year since it was upgraded in 2005 by the Washington Department of Health because one or more of the water quality sampling results from water quality monitoring stations have been identified as *threatened* or *of concern* due to elevated bacterial levels. This early warning indicates that bacterial pollution source identification and control is needed to reduce concentrations of bacterial pollution.

The recent upgrade of the Port Susan shellfish growing area marks an important milestone for all shellfish stakeholders because most of the northern half of the Port Susan had been closed for two decades to commercial shellfish harvest after the initial closure of 11,900 acres in 1987. After the initial closure of the Port Susan shellfish area in 1987, the Washington Department of Health received no requests for classification review, so the area lapsed to Unclassified status in the early 1990s and remained that way for many years. For the purpose of commercial shellfish harvest, Unclassified areas are equivalent to areas that are classified as Prohibited. The Stillaguamish Tribe started collecting marine water samples in the Port Susan shellfish area in 1998 and the Washington Department of Health began analyzing the Tribe's Port Susan samples in 2002 (Brown 2010). The Tribe submitted a formal request to the Washington Department of Health for classification review of Port Susan in 2007. See Appendix B for a copy of the Stillaguamish Tribe's reclassification request letter.

Maintaining or upgrading commercial shellfish growing area classifications requires at least bi-monthly marine water quality sampling to monitor fecal coliform bacteria levels within the growing areas. The Washington Department of Health evaluates the shellfish areas annually by reviewing the prior year's water quality data and assessing potential pollution sources to determine whether the existing classifications are warranted. The annual evaluation results are summarized in a brief report for each shellfish area.[4] Every 12 years the Washington Department of Health also conducts shoreline surveys to identify direct, indirect, and potential sources of bacterial pollution that might impact the classification of shellfish growing areas.

In addition to the individual shellfish growing area reports, the Washington Department of Health prepares a report for each county called the Early Warning System summary. The EWS identifies water sample stations for each shellfish growing area where water quality has a *threatened* or *concerned* status. *Threatened* areas could soon be downgraded in classification because water quality is close to failing the standard, or because existing pollution sources may impact public health. *Concerned* areas still meet the standard for their current classification, but the water quality is declining.

[4] For more information about the Shellfish Growing Area Annual Reports and Early Warning System, see the Washington Department of Health web site, titled at http://www.doh.wa.gov/ehp/sf/growreports.htm.

Washington Department of Health sends the Early Warning System summary reports to local counties, conservation districts, health districts, and tribes. The Early Warning System summary reports for the South Skagit Bay and Port Susan shellfish growing areas are sent to Snohomish County's Surface Water Management Director, who is responsible for administering the CWD shellfish protection program. The South Skagit Bay 2010 Early Warning System summary report to Snohomish County is provided as an example in Appendix C.

Operational Context for this Shellfish Protection Program

Shellfish Stakeholders and Tideland Ownership

For shellfish growing areas adjacent to the CWD, the tribes, a non-tribal commercial shellfish growing company, The Nature Conservancy, and numerous private tideland owners (about 230) between Warm Beach and Kayak Point are the primary shellfish harvest stakeholders.

The Swinomish and Upper Skagit tribes have shellfish harvest rights in South Skagit Bay, but are not currently harvesting in that area. The Tulalip Tribes and the Swinomish Tribe have legally recognized shellfish harvest rights in Port Susan and are actively co-managing shellfish resources throughout their Usual and Accustomed (U&A) fishing areas. The Stillaguamish Tribe does not have legally recognized shellfish harvest rights, but is interested in harvesting shellfish in the future. Tribes harvest shellfish in Puget Sound for commercial as well as for Ceremonial and Subsistence (C&S) purposes.

According to WDFW harvest records, commercial harvest in the South Skagit Bay shellfish area amounted to nearly 6 million pounds of soft shell clams harvested during the eight year period of 2001- 2008. Annual commercial harvest ranged from a low of about 224,000 pounds in 2001 to a high of about 1.12 million pounds in 2003. In 2008, the most recent year of available data, about 927,000 pounds were harvested. Trans Ocean Seafoods is the only licensed non-tribal commercial shellfish grower operating in South Skagit Bay and there is no active tribal commercial shellfish harvest in that area. The Trans Ocean Seafoods website states that their company is the largest commercial softshell clam operation on the west coast.[5]

Non-tribal recreational shellfish harvest adjacent to the CWD is limited to private tidelands between Warm Beach and Kayak Point, which are not open to the public. The only public shellfish tideland adjacent to the CWD that also has public access is at Kayak Point Regional County Park. However, clam harvest at Kayak Point has been closed for years because the local little neck clam population is severely depressed and is not showing signs of recovery despite the closure.

The State and the tribes are responsible for fostering self-sustaining and harvestable shellfish populations. Tribal shellfish harvest rights were legally recognized in 1994 by Federal District Judge Edward Rafeedie (U.S. v. Washington Civil No. 9213, Subproc.

[5] Trans Ocean Seafoods product, sales, and contact information is available on the Internet at http://transoceanseafood.com/pb/wp_8b154a46/wp_8b154a46.html.

89-3) who ruled that the treaty rights reserved by the tribes include the right to half of the total shellfish harvest. The U.S. Supreme Court refused to hear the case on appeal and, after years of negotiation, the State, tribes, and non-tribal commercial shellfish growers reached a settlement agreement in 2007. That agreement is being implemented by WDFW and 17 tribes through the "Revised Shellfish Implementation Plan", which complies with the 1994 Rafeedie decision and defines the primary objective of the plan as follows:

> "…to provide a framework, principles, and course of action for effective cooperative management of the shellfish resources subject to Treaty harvest under the Court's decision of December 20, 1994. In effectuating the rights of the Tribes to take shellfish under the Treaties, this Order also recognizes the State's responsibilities for conservation of public shellfish resources, subject to the Treaty right to take fish at usual and accustomed places."

The Washington State Revised Shellfish Implementation Plan defines specific requirements for tribal harvest on private tideland, such as advance notification of private property owners of tribal intent to harvest, timing of tribal harvest, limits of tribal harvest, and monitoring and enforcement.[6]

Non-tribal commercial shellfish harvesters and private tideland owners also have roles to play in shellfish resource management. Non-tribal commercial shellfish harvesters must be licensed by the Washington Department of Health and report harvest information to the Washington Department of Fish and Wildlife. Non-tribal commercial shellfish harvesters may harvest on their own private tideland, harvest under lease agreement on private tideland owned by other parties, or harvest on public tideland under lease agreement with the Washington Department of Natural Resources. Private tideland owners may harvest shellfish for recreational purposes without any licensing or harvest reporting requirements.

In South Skagit Bay, there are a variety of private tideland owners, including 600 acres operated by New England Shellfish, which is part of Trans Ocean Seafoods. In Port Susan, The Nature Conservancy owns several thousand acres of tideland for the purpose of wildlife and habitat conservation. Other Port Susan tideland owners include WDFW, Twin City Foods, Warm Beach Christian Camp, and a few other private entities. Tidelands from Warm Beach south to the northern boundary of the Tulalip Reservation are divided into numerous privately owned small tracts. Snohomish County owns tidelands at Kayak Point Regional County Park. All tidelands that are not privately owned are managed as public tidelands by the Washington Department of Natural Resources.

[6] For more information about the 1994 Rafeedie decision, see the Northwest Indian Fisheries Commission website at http://www.nwifc.org/about-us/shellfish/rafeedie-decision/. For more information about the 2007 Commercial Shellfish Growers Settlement, see http://nwifc.org/about-us/shellfish/commercial-shellfish-growers-settlement/. The Tulalip Tribes' web site also provides useful information about their shellfish management program at http://www.tulalip.nsn.us/htmldocs/shellfish.htm.

Early Action Watershed Planning

In 1987, pursuant to the Puget Sound Water Quality Management Plan, the Stillaguamish and Tulalip tribes nominated the Stillaguamish watershed for early action watershed planning. This was prompted by the 1987 downgrade of the commercial shellfish growing area and the interest of the tribes in restoring shellfish harvesting opportunities. Snohomish County Public Works was identified as the lead for watershed planning, and funding was made available through the Washington Department of Ecology from the Centennial Clean Water Fund. A stakeholder committee was formed in 1988. Snohomish County Public Works, Surface Water Management completed a Technical Supplement watershed characterization study in 1989 to support this process (Snohomish County 1989). The Stillaguamish Watershed Action Plan was finalized and approved by the Washington Department of Ecology in January 1990. Key findings of the watershed management committee regarding nonpoint pollution in the Stillaguamish watershed are shown below (Snohomish County 1990):

- Nonpoint pollution is the responsibility of everyone to correct. Public involvement in the watershed action planning process is essential to the overall success and implementation of the Stillaguamish Watershed Action Plan.
- The four main land use activities that contribute are agricultural practices, onsite sewage disposal practices, development and urban runoff, and forest practices.
- Bacterial pollution and sediment are the two most prevalent pollutants in the watershed.
- The major source of bacterial contamination in the Stillaguamish River is from agricultural practices.
- Onsite sewage disposal systems are the primary source of bacterial pollution in the Warm Beach Community area.
- Major sources of sediment are, in order of priority, forest practices, agricultural practices, and development and urban runoff.
- Public knowledge of nonpoint pollution and influence from land and water-based activities on downstream water quality is inadequate and needs to be improved.
- Existing water quality data on the Stillaguamish watershed is limited and the extent of pollution could not be determined for this planning process.
- Coordination and communication among and between agencies and interest groups regarding natural resource management need improvement.

The Tulalip Tribes and Snohomish County were identified as co-lead agencies for oversight and implementation of the Stillaguamish Watershed Action Plan. The Stillaguamish Implementation Review Committee (SIRC) was established as a forum to support plan implementation and resolution of issues that may develop. The Action Plan identified twenty-one implementing agencies. Key agencies identified for implementing the Stillaguamish Watershed Action Plan recommendations included Snohomish County Public Works, Snohomish Conservation District, Snohomish Health District, Tulalip and Stillaguamish tribes, Washington Department of Fisheries, and Washington Department of Ecology. Beginning in the late 1990s the SIRC shifted its focus to salmon recovery and in April 2010 the SIRC changed its name to the Stillaguamish Watershed Council.

Washington State Dairy Nutrient Management Act

The Washington Department of Agriculture administers the 1998 Dairy Nutrient Management Act (RCW 90.64), which requires dairy farmers to develop and implement approved dairy nutrient management plans. The plans are intended to provide livestock operations with a site specific set of Best Management Practices (BMPs) that will prevent discharge of livestock nutrients to surface and ground water. The Washington Department of Agriculture inspects each dairy at least once every 22 months. Inspectors evaluate the production facilities, nutrient management practice implementation, and nutrient application record keeping for any risk of livestock nutrients (manure and associated wastes) impacting water quality. In the Stillaguamish watershed there are 20 dairies and all of them have approved dairy nutrient management plans. The Washington Department of Agriculture has inspection and enforcement responsibilities for dairies and concentrated animal feeding operations. The Washington Department of Agriculture responds to all dairy related water quality complaints. The Washington Department of Agriculture can also conduct pollution source tracking if high fecal coliform levels are found in the agricultural drainages near commercial dairies (McKinnon 2010).

Total Maximum Daily Loads (TMDLs)

Section 303d of the federal Clean Water Act requires states to prepare a list of impaired water bodies (303d list) that do not meet water quality standards for ensuring the water is healthy for beneficial uses, including fish and wildlife habitat, domestic and agricultural water supplies, and recreation in and on the water. All water bodies identified on the 303d list must attain water quality standards within a reasonable time period, either through the development of a *water cleanup plan* (also known as a TMDL implementation plan) or other pollution control mechanisms.

The Washington Department of Ecology has listed the Stillaguamish River and the South Fork Skagit River as impaired water bodies for high levels of fecal coliform. Both rivers have approved water cleanup plans for fecal coliform that were completed in 2007. These TMDL implementation plans include specific action recommendations and commitments of government agencies, tribes, and private organizations for water quality cleanup. As such, the TMDL implementation plans were used as primary references for this shellfish program.

The Washington Department of Ecology is developing a freshwater bacterial pollution characterization study for South Skagit Bay, which will focus on upland areas from Big Ditch, near the mouth of the South Fork Skagit River, to Irvine Slough in Stanwood (Svrjcek 2010). The study design will be completed in the summer of 2010 and one year of water quality sampling will begin in the fall of 2010.

National Pollutant Discharge Elimination System (NPDES): Municipal Stormwater Permit

Snohomish County has operated its stormwater systems and programs under the NPDES Phase 1 Municipal Stormwater Permit since 1995. The permit authorizes the discharge of stormwater to surface waters and to ground waters of the state from

municipal separate storm sewer systems (MS4s) owned or operated by the permit holder in the geographic area covered by the permit. NPDES municipal stormwater permits require permit holders to develop and implement a *stormwater management program*. The permit is issued by the Washington Department of Ecology to implement portions of the federal Clean Water Act, and regulates how the County operates its stormwater systems. The permit was reissued with significantly increased programmatic requirements on February 16, 2007.

Under the current permit, the stormwater management program is required to address the following elements:

1. Legal Authority
2. Municipal Separate Stormwater Sewer System (MS4) Mapping
3. Coordination
4. Public Involvement and Participation
5. Controlling Runoff from New Development, Redevelopment, and Construction Sites
6. Structural Stormwater Controls
7. Source Control Program for Existing Development
8. Illicit Connections and Illicit Discharge Detection and Elimination (IDDE)
9. Operation and Maintenance Program
10. Education and Outreach

Implementation of this permit is expected to reduce pollutants in the County's storm drainage systems and contribute to improved water quality for shellfish. For example, the Operation and Maintenance program, as of 2009, requires annual inspection and maintenance of the County's catch basins and newer stormwater detention (storage) facilities. Since many water pollutants attach to sediment, which is often captured and held in the bottoms of catch basins or in storage facilities, more frequent maintenance will remove more of these sediments, thereby reducing pollutants in the storm drainage systems and in the downstream systems. In addition, properly functioning stormwater storage areas will reduce downstream peak flows and, as a result, potentially reduce erosion, thereby reducing the amount of sediment that could impact shellfish growing areas.

The current Snohomish County NPDES Phase 1 Municipal Stormwater permit includes specific requirements for implementing TMDL actions for the Snohomish River and Swamp Creek, but not for the Stillaguamish River because the Stillaguamish TMDL Implementation Plan had not yet been approved by the U.S. Environmental Protection Agency when the NPDES permit was issued in 2007. However, Stillaguamish TMDL actions will be included in the next permit update, which is scheduled to occur in 2012. The County has also voluntarily implemented some of the Stillaguamish TMDL actions, such as conducting expanded IDDE investigations.

Snohomish County was required under its NPDES municipal stormwater permit to revise the Snohomish County Water Pollution Control Code (chapter 7.53 SCC) to require implementation of operational, structural and/or treatment BMPs. This applies to

any person storing or using materials containing contaminant in any manner that may result in a prohibited discharge. A prohibited discharge includes any discharge that contains contaminants. These changes to chapter 7.53 SCC became effective in August 2008.

As part of its NPDES municipal stormwater permit, Snohomish County has also created a new county-wide long-term water quality monitoring program focused on TMDL priorities (Britsch 2010). This new program replaced the County's long-standing ambient water quality monitoring program in 2010. The new long-term water quality monitoring program includes a contaminant source survey approach for identifying bacterial pollution sources, which is adapted from a model that has been implemented in Florida (Wapnick et al. 2009). It is based on recommendations from the World Health Organization and the United States Environmental Protection Agency. This contaminant source survey approach will help Snohomish County work with stakeholders to identify and control bacterial pollution.

Skagit County's NPDES Phase 2 Municipal Stormwater Permit became effective on February 16, 2007. The cities of Arlington and Granite Falls also operate under NPDES Phase 2 Municipal Stormwater Permits, effective in 2007. The Phase 2 permit requires the development of a stormwater management program with many similar elements to the County's program, with the goal to reduce stormwater pollution. The City of Stanwood is not an NPDES Phase 2 community because it did not meet the minimum population threshold and/or population growth rate criteria in 2007 (McRea 2010). However, the City of Stanwood has adopted the 2005 Washington Department of Ecology Stormwater Manual (Bullington 2010).[7]

Critical Area Regulations

Counties and cities are required to designate and protect critical areas under the Washington State Growth Management Act (GMA). Best Available Science (BAS) must be used in crafting policies and development regulations to protect the functions and values of critical areas. Fish and wildlife conservation areas are one of five critical areas identified in the GMA. WAC 365-190-080 (5) lists "Commercial and recreational shellfish areas" as a type of fish and wildlife conservation area. Snohomish County Code, Skagit County Code, and City of Stanwood Code all identify shellfish growing areas as critical areas.

Snohomish County On-Site Septic Systems Management Plan

In 2007 the Snohomish Health District developed its "Snohomish County Onsite Septic Systems Management Plan", which documents the District's response to new requirements established in 2006 by the State of Washington for the twelve Puget Sound counties to protect public health from on-site septic system pollution (Snohomish

[7] Stanwood Municipal Code Chapter 17.140.050 (Stormwater Management Performance Standards) adopts the 2005 Edition of the Washington State Department of Ecology's "Stormwater Management Manual for Western Washington."

Health District 2007).[8] The new requirements include developing written plans for how counties manage onsite septic systems in their jurisdictions as well as in marine areas. The Snohomish Health District's Onsite Septic Systems Management Pan describes how the District's existing onsite sewage disposal program addresses these new requirements and proposes some "potential enhancements" that could be made to its existing program if funding is available.

One of the new requirements is for local health jurisdictions to propose a marine recovery area (MRA) for land areas where existing on-site sewage disposal systems are a significant factor contributing to threatened or downgraded shellfish growing areas, marine waters that are impaired for low dissolved oxygen or fecal coliform, or marine waters where nitrogen is a contaminant of concern identified by the local health officer. The Snohomish Health District evaluated the entire Snohomish County marine shoreline and concluded, based on the guidelines and criteria defined by the State, that MRAs were not necessary in Snohomish County.

However, for the Port Susan area, the Snohomish Health District acknowledged long-standing public concerns about on-site septic systems in the Warm Beach area and proposed to undertake a pilot project that would "…undertake many of the investigative activities that an MRA strategy would entail" (SHD 2007, pp. 27 - 28). With grant funding from the Washington Department of Health, the Snohomish Health District subsequently implemented the Warm Beach pilot project and documented it in a final report, titled "Warm Beach On-Site Sewage System Sanitary Survey" (SHD 2009). Through this pilot project SHD found one failing sandfilter on-site septic system and no evidence of direct sewage discharge into marine waters from the Warm Beach area.

Northwest Straits Marine Conservation Initiative

The Snohomish County Marine Resources Advisory Committee (MRC) is authorized by Chapter 2.800 SCC and is one of seven advisory committees participating in the Northwest Straits Marine Conservation Initiative. In 1997, U.S. Senator Patty Murray and U.S. Congressman Jack Metcalf recognized the need to protect the marine waters of Washington State and with that strong bipartisan alliance the Initiative was created by Congress in 1998. The purpose of the MRC is to address local marine issues and recommend remedial actions to the Snohomish County Council, Executive and, where requested by the Council or Executive, to other local governmental entities and tribes. The Snohomish MRC is currently working on the creation of a voluntary marine stewardship area in Port Susan in partnership with Island County Marine Resources Committee, the Tulalip Tribes, and The Nature Conservancy. Shellfish has identified as a conservation target for the Port Susan marine stewardship area.

[8] See RCW 70.118A (On-site sewage disposal systems – marine recovery areas). "…it is the purpose of this chapter to authorize enhanced local programs in marine recovery areas to inventory existing on-site sewage disposal systems, to identify the location of all on-site sewage disposal systems in marine recovery areas, to require inspection of on-site sewage disposal systems and repairs to failing systems, to develop electronic data systems capable of sharing information regarding on-site sewage disposal systems, and to monitor these programs to ensure that they are working to protect public health and Puget Sound water quality."

Puget Sound Partnership Action Agenda
In 2007, Governor Gregoire proposed and the Legislature created the Puget Sound Partnership to reverse Puget Sound's decline and restore it to health by 2020. The Partnership published the Puget Sound Action Agenda on December 1, 2008 (Puget Sound Partnership 2008). The Action Agenda outlines a set of actions that are needed to protect and restore Puget Sound.

The Action Agenda includes the following indicators of a healthy Puget Sound, which relate to shellfish protection and harvest:

- freshwaters, marine waters, and sediments are of a sufficient quality to provide safe drinking water, swimming opportunities, and shellfish harvest;
- acres of tidelands certified for commercial shellfish harvest are increased; and
- shellfish populations are sufficient to accommodate recreational, commercial and tribal treaty rights.

This shellfish program will be useful to the Puget Sound Partnership, Snohomish County, and other shellfish stakeholders for addressing the shellfish elements of the Puget Sound Action Agenda. It will also help to improve freshwater and marine water quality for other beneficial uses, such as swimming and fishing.

Pacific Shellfish Institute Report
In response to the long-standing shellfish closure in Port Susan, Snohomish County contracted with the Pacific Shellfish Institute in 2007 to conduct a study of the CWD shellfish resource management situation and produce a report with findings and recommendations (Pacific Shellfish Institute 2007 and 2009). The scope of work for this study included the following tasks:

1. Determine harvest potential for tribal, commercial and sport shellfisheries in South Skagit Bay and Port Susan,
2. Review shellfish reclassification efforts in other communities with specific conclusions about why they were successful and applicability to the Port Susan shellfish resource,
3. Make recommendations on steps and time necessary to improve the likelihood of upgrading shellfish growing areas in Port Susan.

The Pacific Shellfish Institute conducted Task 1 and subcontracted much of the work for Task 2 and Task 3 to the Puget Sound Restoration Fund. Both non-profit organizations have expertise in shellfish restoration. The Pacific Shellfish Institute specializes in scientific expertise related to shellfish biology, conservation, and aquaculture. The Puget Sound Restoration Fund specializes in working with local communities and stakeholders to achieve grassroots results for water quality and shellfish restoration. The final reports from this study served as primary references for this shellfish program.

Stillaguamish Shellfish Restoration Planning Project
Beginning in 2008, in response to a recommendation from the CWD Advisory Board, Snohomish County Surface Water Management staff led a shellfish restoration planning process with input from a steering committee and other stakeholders. The purpose of

this project was to define goals, objectives, and actions for bivalve shellfish restoration within the CWD. This project was funded by a Local Government Stormwater Grant from the Washington Department of Ecology (Stormwater Grant G0800241). The steering committee was established to assist and advise the County on the development of a shellfish restoration plan. The steering committee included representatives from the following organizations, which have strong interests or jurisdiction in water quality protection and shellfish restoration:

- Tulalip Tribes – Maria Calvi, Restoration Ecologist; Mike McHugh, Shellfish Manager; Cathy Stanley, Shellfish Biologist
- Stillaguamish Tribe – Pat Stevenson, Environmental Manager; Jody Brown, Fisheries Biologist
- Island County – Matt Kukuk, Resource Enhancement Manager
- Snohomish County Department of Public Works, Surface Water Management – Sean Edwards, Senior Planner; Randy Middaugh, Principal Planner; Ann Bylin, Water Quality Specialist.
- Snohomish Conservation District – Amanda Ruzicka, Farm Planner; Bobbi Lindemulder, Acting District Manager
- Snohomish Health District – Kevin Plemel, Environmental Health Manager
- Warm Beach Christian Camp and Conference Center – Kelly Wynn, Utility Manager
- Washington Department of Agriculture, Dairy Nutrient Management Program – Cara McKinnon, Agricultural Inspector
- Washington Department of Ecology – Ralph Svrjcek, TMDL Coordinator; Sally Lawrence, TMDL Coordinator
- Washington Department of Fish and Wildlife – Jennifer Whitney, Shellfish Biologist
- Washington Department of Health, Office of Shellfish and Water Protection – Scott Berbells, Registered Sanitarian; Lawrence Sullivan, Public Health Advisor

In addition to the steering committee members listed above, the following other key stakeholders were notified of the project and were invited to provide feedback and advice on the shellfish plan:

- City of Stanwood – Andy Bullington, Public Works Director
- Skagit County – Rick Haley, Water Quality Analyst
- Stillaguamish River Clean Water District Advisory Board
- Swinomish Tribe – Jim Gibson, Shellfish Biologist
- The Nature Conservancy – Kat Morgan, Port Susan Preserve Manager
- Boettner Tidelands – John Boettner, Manager
- Upper Skagit Tribe – Scott Schuyler, Natural Resource Policy Analyst, Jon-Paul Shannahan, Natural Resources Biologist

The steering committee provided shellfish and water quality data, advice on the actions necessary to reduce bacterial contamination, advice on agency laws and guidelines, and advice regarding state/tribal co-management of the shellfish resources in South Skagit Bay and Port Susan.

The steering committee attended monthly meetings from March through June 2009. Issues regarding water quality problems and potential solutions were defined and vetted through steering committee meetings and review of early draft reports. After defining the issues affecting shellfish certification, the steering committee provided more detailed advice on actions to address water quality problems and maintain viable shellfish resources. Steering committee members provided details on their respective agency's jurisdiction, expertise, and commitment to take action. SWM staff produced a near-final shellfish restoration plan and submitted it as a grant deliverable to the Washington Department of Ecology in June 2009.

In the process of finalizing the shellfish restoration plan, the County and the CWD Advisory Board agreed to transform the near final shellfish restoration plan into the County's Stillaguamish Shellfish Protection Program in accordance with RCW 90.72. The goals, objectives, and actions of the Stillaguamish Shellfish Protection Program are presented below in section 3 of this report.

2. Water Quality Problems Affecting Shellfish Classification

Bacterial pollution affecting the South Skagit Bay and Port Susan commercial shellfish growing areas originates primarily from the Stillaguamish and Skagit river watersheds and secondarily from the north and east sides of Camano Island. Potential sources of bacterial pollution include onsite septic systems, waste water treatment plants, urban stormwater, livestock waste, pet waste, and wildlife.

Stillaguamish River, South Fork Skagit River, and Camano Island

The Washington Department of Ecology's TMDL study for the Stillaguamish River (Lawrence and Joy 2005) indicated that the waters of Port Susan, the mainstem Stillaguamish River, its major forks and a number of tributaries and smaller creeks were impaired with excess fecal coliform bacteria. Areas with the highest density of human activity tended to exceed state standards year round, while in less populated areas, bacterial pollution was only a problem during either dry or wet weather periods, but not both. Based on this bacterial pollution TMDL study, the Washington Department of Ecology determined that thirty-four water bodies or stream reaches require reductions in bacteria to meet TMDL targets.

The current bacterial pollution load and percent reduction required to meet the fecal coliform TMDL target for each of the Stillaguamish TMDL water bodies and stream reaches are presented in Table 1. Figure 4 shows this information geographically. The Stillaguamish fecal coliform TMDL information presented in Table 1 and Figure 4 is useful for targeting and prioritizing bacterial pollution source identification and correction efforts. Stream reaches and subbasins that have high percent reduction requirements and relatively high loading should be considered high priorities for water quality monitoring, pollution source control, and outreach and education. Although additional work is needed to characterize bacterial pollution sources at the stream reach and subbasin scale, this Stillaguamish TMDL information indicates that bacterial pollution source identification and control efforts should be focused on the lower Stillaguamish River floodplain, Church Creek, March Creek, Harvey-Armstrong Creek, Portage Creek, Fish Creek, and Warm Beach.

Sources of bacterial pollution that are closest to the commercial shellfish growing areas are generally assumed to have the greatest potential impact on shellfish classification, but that assumption warrants further examination given the high bacterial pollution loads from the upper watershed.

One of the challenges in protecting shellfish areas is that bacterial pollution standards for shellfish marine water are more stringent than the standards for freshwater. Freshwater entering the bay from streams that meet the freshwater standard of 100 cfu/100 mL, may not meet the shellfish standard of 43 MPN/100 mL and thereby still contribute to contamination of the shellfish growing area. Nevertheless, it is assumed that achieving the freshwater standards used for the fecal coliform TMDL targets will generally improve marine water quality for shellfish. The Washington State human water

contact categories and bacterial water quality standards that must be met to protect public health are presented in Appendix D.

Table 1: Stillaguamish TMDL Fecal Coliform Loading and Percent Reduction Required.[9]

TMDL Water Body or Stream Reach	Percent Reduction Required to Meet Fecal Coliform TMDL Target	Current Bacteria Load (cfu/day)	Critical Condition Geometric Mean (cfu/day)
Irvine Slough	99	NA	730
March Creek	98	9.35×10^{10}	NA
Twin City Foods Drainage Area (includes Drains 1, 2, 3, & 5)	98	NA	406, 285, 1180, 545
Unnamed Creek #0456	97	5.17×10^{10}	NA
West Pass of Old Stillaguamish Channel	97	6.2×10^{10}	NA
South Pass of Old Stillaguamish Channel	94	2.45×10^{11}	NA
Agricultural Drain to Warm Beach	92	8.86×10^{10}	NA
Glade Bekken	92	7.42×10^{10}	NA
Lake Martha Creek	92	6.38×10^{10}	NA
Miller Creek at Miller Rd.	91	NA	311
Jorgenson Slough (lower Church Creek)	87	NA	320
Portage Creek at 212th	83	4.16×10^{11}	NA
Fish Creek	81	7.4×10^{10}	NA
Warm Beach Creek above WWTP	81	3.11×10^{10}	NA
Armstrong Creek at Mouth	76	1.01×10^{11}	NA
Harvey Creek at Grandview	76	2.33×10^{10}	NA
Church Creek at Park	74	NA	147
Portage Creek at 43rd	69	3.69×10^{11}	NA
Douglas Slough	68	NA	40
Kackman Creek	68	1.79×10^{10}	NA
Warm Beach Dike Pond and Slough	64	4.23×10^{10}	NA
Port Susan	61	Insufficient data to calculate load	NA
Stillaguamish River at I-5	52	6.27×10^{12}	NA
North Fork Stillaguamish	38	1.95×10^{12}	NA
Hatt Slough	36	5.79×10^{12}	NA
Armstrong Creek below Hatchery	29	Insufficient data to calculate load	NA
Pilchuck Creek	26	4.89×10^{11}	NA
Jim Creek	14	4.0×10^{11}	NA
South Fork Stillaguamish	7	2.24×10^{12}	NA

[9] Adapted from Lawrence and Joy (2005).

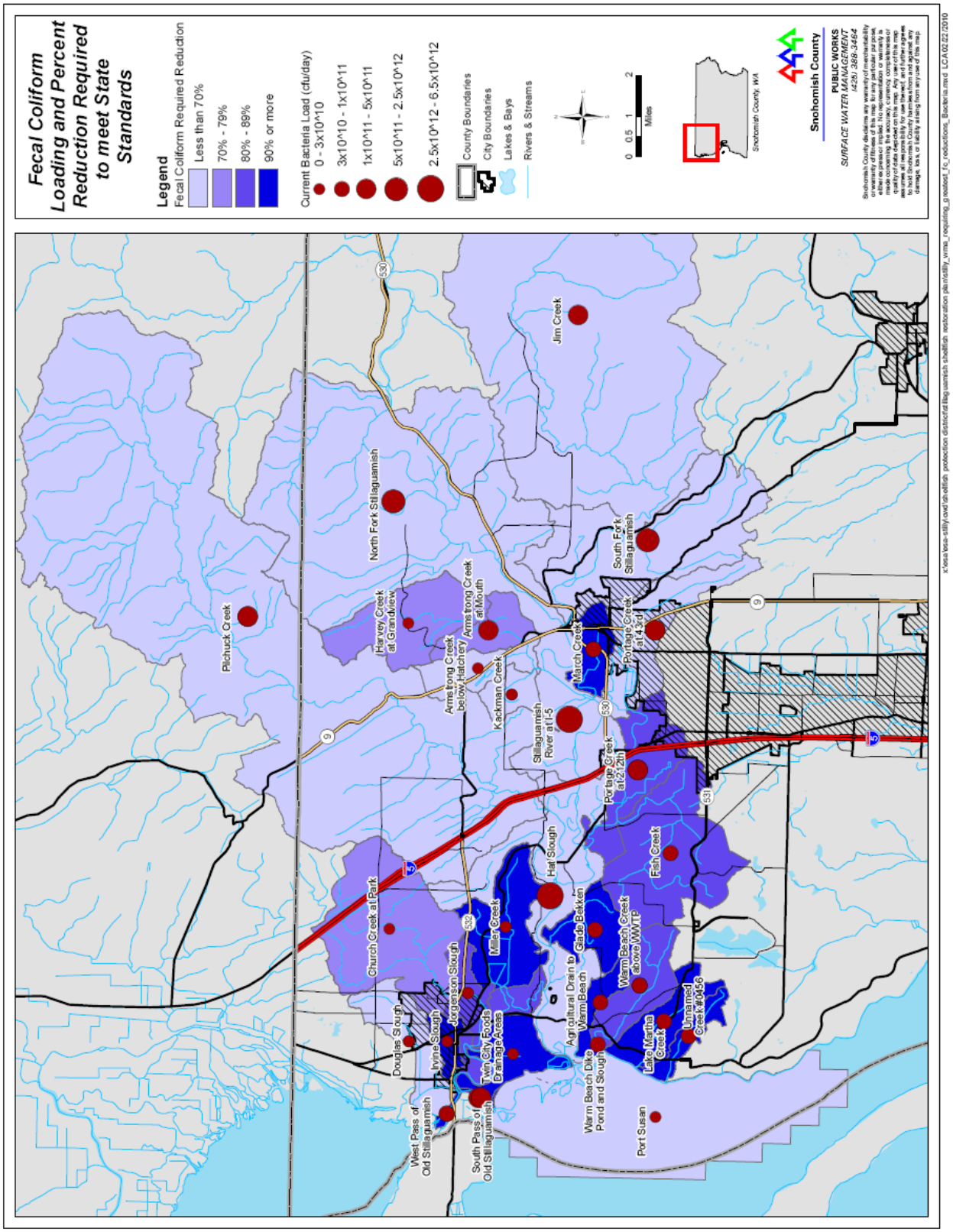

Figure 3: Stillaguamish Fecal Coliform TMDL Loading and Percent Reductions Required.

Skagit Bay and the Skagit River are also listed under section 303d of the Clean Water Act as impaired water bodies for bacterial pollution. The Washington Department of Ecology has prepared the Lower Skagit River TMDL Water Quality Improvement Plan (Lawrence 2007) to address this problem and outline corrective actions needed in that watershed. The 1997 TMDL study on the Skagit River set goals for freshwater fecal coliform levels that exceed Washington State freshwater standards. The new stricter TMDL goals for fecal coliform levels align with fecal coliform standards needed for marine water bodies and shellfish harvest areas. This was done in order to protect the shellfish harvest areas in South Skagit Bay. More recent data was reviewed when developing the Lower Skagit River Fecal Coliform TMDL Implementation Plan (Lawrence 2007). This review led to the following conclusions:

1. The mainstem Skagit River is currently meeting state water quality standards for bacteria, and the North Fork meets the stricter TMDL goals. The South Fork Skagit River meets state standards but needs some improvement to reach the stricter TMDL goals.
2. Bacteria concentrations in the Mainstem Skagit River have decreased significantly since 1982, the first year Ecology's long term station was monitored. At this station, bacteria also decreased significantly between 1995 and 2006.
3. Bacteria levels in the larger tributaries do not meet standards.
4. Bacteria concentrations in freshwater vary seasonally in the basin, with peaks in the river in the fall and in the tributaries in the summer.

Island County initiated a surface water monitoring program in 2006 and has sampled numerous small creeks that empty into South Skagit Bay and Port Susan. Existing data indicates that the following five streams do not meet the State Water Quality standards due to fecal coliform contamination: Arrowhead Creek, Utsalady Creek, Livingston Creek, Kristofferson Creek, and Cavalero Creek (Kukuk 2010). Arrowhead Creek and Utsalady Creek discharge into Utsalady Bay at the north end of Camano Island, about two miles southwest of the South Skagit Bay shellfish growing area. Livingston Creek, Kristofferson Creek, and Cavalero Creek discharge into Port Susan. The Camano Island non-point pollution planning effort identified both Kristoferson Creek and Livingston Creek for bacterial water quality monitoring and clean up (Camano Island Watershed Management Committee 2007).

Another critical resource for understanding bacterial pollution sources affecting the South Skagit Bay and Port Susan shellfish growing areas are the Washington Department of Health's recently completed shellfish classification studies (Berbells 2009a, Berbells 2009b, Berbells 2009c, and Toy 2009). The 2009 South Skagit Bay Shoreline Survey (Berbells 2009a) evaluated 20 drainages/discharges, 15 developed parcels, 11 agricultural activities, and other potential pollution sources along 8 miles of shoreline near the South Skagit Bay shellfish growing area. No "direct" or "indirect" impacts were identified during this survey that would result in a classification downgrade. In general, shoreline conditions were found to support the current growing area classification. However, this shoreline survey also identified numerous "potential sources" of bacterial pollution that may impact the area based on tides and currents,

including the South Fork Skagit River, Big Ditch/Maddox Slough, and Stillaguamish Old Channel West Pass.

Additional evidence of improving bacterial water quality conditions in the Stillaguamish watershed comes from Snohomish County's statistical analysis of long term water quality data from all Washington Department of Ecology, Snohomish County, and Stillaguamish Tribe monitoring sites (Read 2006). The study analyzed data that was collected primarily from 1994 to 2006, but with data going back to 1959 at some stations. Many of the long term monitoring locations showed statistically significant improvements. Overall, bacteria levels appear to be decreasing over time, however at many of these sites there are ongoing exceedances of fecal coliform water quality standards.

As shown in Table 2 below, marine water sampling by the Stillaguamish Tribe from November 2006 to June 2009 found all but one of the stations were meeting minimum requirements for shellfish classification. Figure 3 shows the locations of the Stillaguamish Tribe's Port Susan marine water quality sampling stations.

Table 2: Summary of fecal coliform data for Port Susan marine water samples collected from 09/19/2007 to 4/13/2010.

			Fecal coliform/100 mL water			
Station #		**Number of Samples**	**Range**	**Geometric Mean**	**Est. 90th Percentile**	**Meets Standard**
290	Approved	30	1.7 - 49.0	3.7	12.0	Yes
291	Approved	30	1.7 - 130.0	4.5	22.0	Yes
292	Approved	30	1.7 - 79.0	4.5	21.0	Yes
293	Approved	30	1.7 - 33.0	4.2	17.0	Yes
294	Approved	30	1.7 - 33.0	3.2	11.0	Yes
295	Approved	30	1.7 - 130.0	6.0	35.0	Yes
296	Approved	30	1.7 - 33.0	4.3	18.0	Yes
297	Approved	30	1.7 - 130.0	6.1	33.0	Yes
298	Approved	30	1.7 - 79.0	5.4	23.0	Yes
335	Approved	16	1.7 - 130.0	6.4	28.0	*N/A
299	Prohibited	30	1.7 - 49.0	4.0	16.0	Yes

* N/A – Systematic Random Sample (SRS) criteria require a minimum of 30 samples from each station.

The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms/100 ml and an estimate of the 90th percentile not greater than 43 organisms/100 ml. The above table shows bacteriological results in relation to program standards.

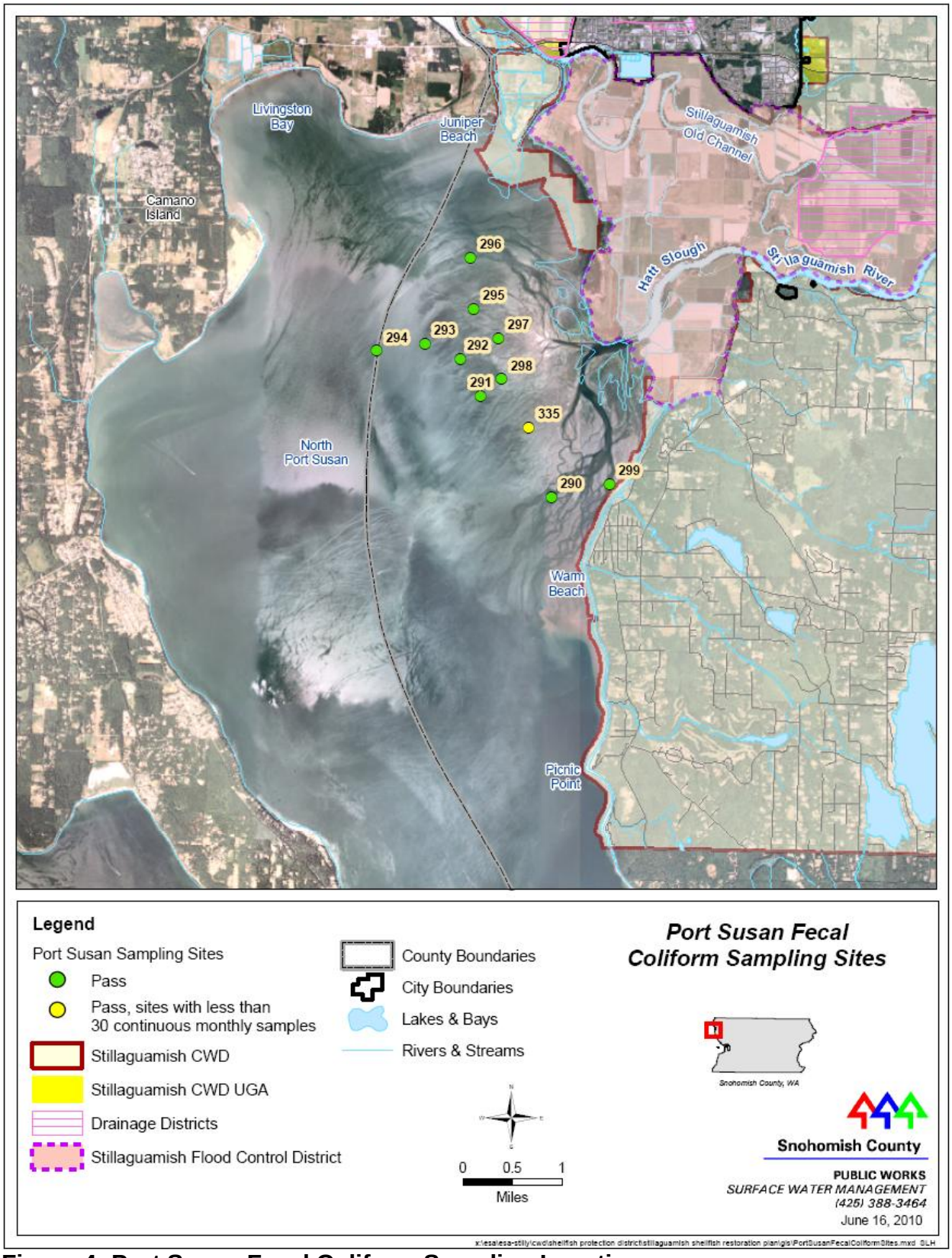

Figure 4: Port Susan Fecal Coliform Sampling Locations.

Over the years many different agencies have implemented water quality monitoring, pollution control, and public outreach and education activities in the CWD, including the Stillaguamish Tribe, Tulalip Tribes, Washington Department of Ecology, Washington Department of Agriculture, Snohomish County, Snohomish Conservation District, Snohomish Health District, City of Stanwood, City of Arlington, Stillaguamish River Flood Control District, and the Warm Beach Christian Camp.

Although it is impossible to show a direct causative link between local water quality cleanup efforts and the recent improvements in water quality over the shellfish growing areas in South Skagit Bay and Port Susan, much of the progress is generally attributed to improvements in dairy farm waste management, on-site septic system maintenance, and wastewater treatment plant upgrades. Much of the remaining bacterial pollution is assumed to be from non-point sources, including on-site septic systems (OSS), pet waste, livestock, and possibly from the large population of snow geese that winter in the lower Stillaguamish River floodplain and estuary.

Human Waste – Onsite Septic Systems (OSS)

Onsite septic systems in proximity to surface waters are a potential source of bacterial pollution. Source identification studies using DNA ribotyping of bacteria in urban Puget Sound streams consistently show the presence of bacteria from human sources. Methods used in these studies do not allow quantification of the sources, but the consistent presence of human waste in multiple watersheds indicate that failing septic systems are a probable source of bacteria in streams. DNA analysis of fecal coliform water quality samples conducted by the Stillaguamish Tribe in conjunction with the Flood Control District identified human waste as a potential source of fecal coliform in Hatt Slough (Stillaguamish Tribe 2007).

Washington Department of Ecology's Stillaguamish Water Quality Implementation Plan (Svrjcek and Lawrence 2007) indicates that "OSS is considered a very likely contributor to many areas showing high bacteria levels during summer months." It also states that the Snohomish Health District is "…among the most crucial organizations in resolving the bacterial pollution problems in this TMDL area."

The Snohomish Health District process of identifying and repairing failed OSS is permit and complaint-driven with some targeted sanitary surveys in areas of concern (Plemel 2009). In 2009 the Snohomish Health District conducted a targeted OSS sanitary survey in the Warm Beach residential area and found only one sand filtration system that required repair (Snohomish Health District 2009). Building permits for remodel, repair, and/or alterations of existing structures necessitate OSS requirements well above those set forth in WAC 246-272A. Snohomish Health District Sanitary Code Chapter 8.1.2 has been a driver for proactive OSS upgrades and is a large reason why nearly one-third of the beachfront systems at Warm Beach have been upgraded in the past 20 years.

Human Waste – Recreational Areas

Recreational areas along rivers and streams without facilities for human waste disposal are also potential sources of bacterial pollution. Some unimproved recreational areas in

the Puget Sound region have been closed due to unsanitary conditions resulting from lack of human waste disposal facilities for fishermen. One recent example of human waste from recreational fishing in the Skokomish watershed received a lot of media attention in August, 2009 (Seattle Times 2009). Skagit County is responding to this problem as part of the Clean Samish Initiative (http://www.ecy.wa.gov/Programs/wq/tmdl/samish/CleanSamishInitiative.html). The Washington Department of Fish and Wildlife and Snohomish County own a number of popular public access sites along the Mainstem, North Fork, and South Fork of the Stillaguamish River that are heavily used by people for fishing, boating, swimming, and hiking. Anecdotal evidence indicates that human waste may be a problem at some of these sites. No systematic studies have yet been conducted to evaluate the extent of this problem in the Stillaguamish watershed.

Wastewater Treatment Plants and Conveyance Systems

Five wastewater treatment plants (WWTPs) discharge into the Stillaguamish Watershed: City of Stanwood, Warm Beach Christian Camp, City of Arlington, Indian Ridge Correctional Facility, and Twin City Foods. Each of these plants has undergone significant upgrades over the past decade. WWTP upgrades have likely contributed significantly to improved bacterial water quality over the past two decades. The Washington Department of Ecology regulates WWTPs and evaluates discharges from WWTPs every month based on discharge monitoring reports submitted monthly by the permittees. The discharges are authorized/reauthorized through the National Pollutant Discharge Elimination System (NPDES) permitting process every five years (Dawda 2010). The Twin City Foods WWTP is operated under a Washington State waste discharge permit rather than an NPDES permit because the treated effluent is applied to agricultural land rather than discharged directly into the river. The City of Granite Falls WWTP discharges to the Pilchuck River, which is a tributary of the Snohomish River.

Stanwood WWTP: The City of Stanwood WWTP discharges into the tidally influenced Old Stillaguamish River channel (WDOE 2005a). This oxidation ditch activated sludge wastewater treatment facility has a capacity of 1.5 million gallons per day (mgd). City of Stanwood WWTP improvements in 2004 were cited by the Washington Department of Health as one of the factors for upgrading the South Skagit Bay shellfish growing area classification in 2006. The improved WWTP is equipped with high-technology systems and alarms that automatically divert effluent to the old lagoon during specified malfunction events (NPDES Permit Condition S5.C.).

As a result of these upgrades, the Washington Department of Health does not consider this facility to be an *actual*, *direct*, *indirect*, or *potential* pollution source to South Skagit Bay (WDOH 2005). However, the January 2009 flood event caused overtopping of the sludge (biosolids) treatment lagoons (Dawda 2010). The Washington Department of Health responded by closing the South Skagit Bay shellfish growing area January 9 – 16, 2009. One other overtopping event occurred as a result of the November 1990 flood. In response to the 2009 flood event the City of Stanwood raised the north and east perimeter dikes and constructed Larsen Dam to block flood water from flowing into Irvine Slough between highway 532 and the WWTP (Bullington 2010).

Stanwood's NPDES waste discharge permit includes a special shellfish protection reporting provision that requires the City of Stanwood to immediately notify the Washington Department of Health, Office of Shellfish and Water Protection if there is any unauthorized discharge, diversion to the storage lagoon, or if the effluent fecal coliform sample result shows "too numerous to count." The upgraded treatment plant has received Outstanding Treatment Plant Awards from the Washington Department of Ecology every year from 2006 through 2009 (Bullington 2010). Stanwood's current five-year NPDES waste discharge permit expires December 22, 2010. Stanwood has applied for renewal of its permit (Dawda 2010).

Warm Beach Christian Camps and Conference Center WWTP: The Warm Beach WWTP discharges directly into Port Susan. Improvements to the Warm Beach WWTP include a wetland treatment system with the ability to store wastewater for several days if there is a treatment failure. It also includes a recently installed membrane filtration system that treats effluent to a Class A reuse standard prior to discharge to Port Susan (WDOE 2008). The NPDES permit authorizes effluent discharges to Port Susan year round, but only when the receiving water level is at least one foot above the outfall pipe (Dawda 2010). As a result of these improvements, the effluent from the Warm Beach WWTP meets fecal coliform requirements. The Warm Beach Christian Camp has applied to the Washington Department of Health and Washington Department of Ecology for approval to apply reclaimed water to their pastures as irrigation water during summer months. The current five-year NPDES permit expires October 29, 2013.

Arlington WWTP: The City of Arlington WWTP discharges into the Stillaguamish River mainstem just below the confluence of the North Fork and South Fork about 18 miles upstream from the mouth of the river. The Arlington WWTP is undergoing a $42 million expansion and upgrade due to be completed in 2011 (Wolanek 2010). The upgrade includes installation of membrane bioreactor (MBR) and biological nutrient removal (BNR) technologies designed to meet Washington Department of Ecology requirements to reduce pollution levels in the Stillaguamish River. The MBR treatment system has been completed and started operating in June 2010. Once the BNR system becomes operational (estimated date January 2011), the plant capacity will be 2.67 mgd (Dawda 2010). The current five-year NPDES waste discharge permit expires January 27, 2014 (WDOE 2009).

Indian Ridge WWTP: The Indian Ridge Corrections Center is a low-security corrections facility, located east of the City of Arlington, which discharges to Jim Creek, a tributary of the South Fork Stillaguamish River. The facility is owned by Washington Department of Natural Resources and it has been leased to the Washington Department of Corrections. The facility is currently inactive and has had no residents for several years (Olson 2010). Until 2009, the Washington Department of Natural Resources had leased the facility to Snohomish County. Snohomish County operated the WWTP under an NPDES waste discharge permit that expired in 2009 (WDOE 2004). The facility has been unoccupied and the treatment plant shut down since the summer of 2005. The permit is now held by the Washington Department of Corrections and it has been

extended (Dawda 2010). The WWTP was upgraded in 1997 from a package activated sludge system to a sequencing batch reactor (SBR) system. During the facility upgrade, the chlorination system was replaced with a UV disinfection system. This is a very small facility with maximum monthly average design flow of 21,000 gpd.

Twin City Foods WWTP: The Twin City Foods vegetable processing plant opened more than 60 years ago in Stanwood (WDOE No date). Effluent from the original canning operations discharged directly to the Stillaguamish River. As Twin City Foods grew in the 1950s and effluent volumes increased, the company began irrigating their discharges onto adjacent farmland on a trial basis. The City of Stanwood built a sewage lagoon system in the 1970s to treat municipal wastewater and the industrial wastewater from Twin City Foods; however, most of the Twin City Foods process and wastewater continued to be land applied. When the high discharge volumes of summer process wastewater from Twin City Foods proved to overload the Stanwood lagoon system, Twin City Foods began full-time land application of process and summer repack wastewater. Twin City Foods built an 8.4 million gallon capacity lagoon in the mid-1990s, located on Florence Island near the Port Susan sea dike to store process wastewater and non-contact cooling water prior to its land application. Twin City Foods built an additional 8 million gallon capacity lagoon in 2000 (Levander 2010).

The two Twin City Foods lagoons do not receive any “sanitary” wastewater inputs. They only receive vegetable processing wastewater and a small amount of drainage from the back parking lot at the processing plant in Stanwood. Twin City Foods’ Washington State waste discharge permit for land application of process water and non-contact cooling water has included fecal coliform water quality monitoring since 2005. Twin City Foods volunteered to monitor fecal coliform in the ditches and surface water draining the land application area to assist the Washington Department of Ecology in assessing water quality. Table 1 and Figure 3 show that fecal coliform concentrations in the Twin City Foods land application drainage areas are relatively high. However, the Twin City Foods land application site is surrounded by dairy farms and is heavily used by migratory birds. Twin City Foods has also planted crops to attract and aid the overwintering of some bird species. After a thorough review of Twin City Foods practices and plant operations, the Washington Department of Ecology removed Twin City Foods from consideration as directly contributing to the fecal coliform levels in the irrigation ditches and the Old Stillaguamish Channel (Levander 2010). Twin City Foods’ current State waste discharge permit expires November 3, 2010 (WDOE 2005b).

Wastewater Conveyance Systems: Relatively little is known about the potential of sanitary sewer lines to leak and, as a result, possibly contaminate local surface and groundwaters. Many sewer lines are located near or under streams and wetlands. For example, there are approximately 17 locations in the Portage Creek sub-basin where City of Arlington sewer lines run below stream beds. However, there is very low risk of contamination at most crossings because of the depth of the pipe below streams, the positive pressure of groundwater on a gravity main, and the use of trench blocks to reduce preferred flow of any leaks through trenches (Wolanek 2010). There are two

locations in the City of Arlington where a force main (pumped flow under pressure) crosses a stream (South Slough and Portage Creek).

Sanitary sewer lines that leak could potentially have two impacts. First, especially in the summer, sewage may leak out of the pipes into the surrounding ground and possibly into the ground or surface waters. And second, especially in the rainy season, stormwater runoff could seep into the sewer conveyance systems and, in a worst case scenario, may overtax the pipe system or the treatment system, causing overflows. Overflows can also be caused by physical blockages in the underground sewer pipes, such as debris or a collapsed pipe section. Overflow events can pose an immediate threat to human health and are generally resolved quickly. The Washington Department of Ecology reviews all overflow incidents when they are reported.

Livestock Waste

Livestock waste near surface waters can contribute to fecal coliform impairments when not properly contained by BMPs. The Washington Department of Health completed the "Water Quality Study of Lower Skagit Bay" in 1986, which resulted in the downgrade of the 6,140-acre South Skagit Bay shellfish growing area from Approved to Restricted (WDOH, 1986). This study identified nonpoint pollution from the Skagit River system including agricultural livestock waste as a potential source of pollution which could affect the sanitary condition of Skagit Bay waters. Livestock waste from dairies was also identified as one of the sources of bacterial pollution that led to the closure of the Port Susan shellfish growing area (Lukes 1987). However, implementation of the Washington Dairy Nutrient Management Program administered by the Washington Department of Agriculture has contributed to water quality improvements in South Skagit Bay and Port Susan.

The Stillaguamish TMDL Water Quality Implementation Plan identifies the following issues associated with livestock waste:

- there are a large number of horses in the watershed,
- there are many pathways from pastures to surface water,
- the number of hobby farms is unknown, and
- with the exception of licensed dairy farms, there are no specific requirements for livestock BMPs.

DNA analysis of fecal coliform water quality samples coordinated by the Stillaguamish Tribe in cooperation with the Stillaguamish River Flood Control District identified horses as a source of fecal coliform contamination at a stream sample location next to the Warm Beach Christian Camp's horse stables (Stillaguamish Tribes 2007). This stream drains the Happy Hollow area and flows into the Warm Beach Dike Pond. This type of DNA source tracking may be useful for other bacterial pollution hot spots in the CWD, but it is expensive and it can only detect presence/absence of specific genetic signatures.

Pet Waste

Pet waste can also contribute to bacterial pollution in surface waters. The Stillaguamish River Water Quality Implementation Plan (Svrjcek and Lawrence 2007) identified the need for proper pet waste management on private properties near streams and stormwater conveyances, as well as public areas where dogs are allowed to exercise. Snohomish County Surface Water Management has estimated that annual fecal waste produced by all of the dogs in Snohomish County is equivalent to the amount human waste produced from a city of 40,000 people (Frenzl 2010). Snohomish County surveys of pet owners have also indicated that about 85% of the waste produced by pets in unincorporated Snohomish County is deposited in people's back yards, not in public spaces. However, pet waste left near streams and rivers may have a disproportionally high impact on water quality. Through the County's NPDES permit, an education and outreach program on pet waste problems and solutions is being developed.

Wildlife Waste

Wildlife can contribute a significant load of bacteria, nutrients, and oxygen-demanding substances when they are found in large numbers. The first small flocks of snow geese arrive on the Skagit-Fraser estuaries in late September and build in numbers throughout October and early winter. A small portion move on, and then the population is relatively stable until spring. This flock numbered about 41,100 per year during 1987-96. With other flocks of geese, swans, and ducks joining the snow geese, the populations of waterfowl overwintering in the lower Stillaguamish waterways and adjacent fields are substantial (Cullinan 2001 in Lawrence and Joy 2005). According to the Washington Department of Health's 2009 Port Susan Sanitary Survey report (Toy 2010), "The freshwater fecal coliform loads are the likely cause of criteria violations in Port Susan since seals and birds are present in winter and spring when criteria in the bay are often met."

Stormwater

Stormwater from urban, suburban, and rural areas can be a significant source of bacterial and sediment inputs to local surface waters. Stormwater from impervious surfaces and private property that runs off into the public stormwater drainage system can concentrate bacterial inputs and wash bacteria into surface water during storm events. Sources of bacteria in stormwater are often difficult to identify, but bacterial pollution in stormwater is common and sources can vary widely depending on local land uses and environmental conditions. For more detailed discussion of bacterial pollution from stormwater, see the Stillaguamish TMDL Implementation Plan (Svrjcek and Lawrence 2007, pp. 26 - 27). For those jurisdictions under the NPDES municipal stormwater permit program, the NPDES permit requirements are designed to reduce stormwater pollution, including bacterial pollution.

3. Shellfish Protection Goals, Objectives, and Actions

This section presents the Stillaguamish Shellfish Protection Program goals, objectives, and actions, which were developed by Snohomish County Surface Water Management staff working in consultation with the steering committee and other stakeholders described above in section 2 of this report. Many of the actions in this program were gleaned from existing documents, primarily the Stillaguamish Water Quality Implementation Plan (Svrjcek and Lawrence 2007) and the Pacific Shellfish Institute reports (2007 and 2009) prepared for Snohomish County.

Commitments to implement actions identified in the Stillaguamish Shellfish Protection Program are mostly voluntary and budget dependent. Some of the actions in this program do not have commitments for implementation, but they are included to show that they are important for shellfish protection and to encourage appropriate agencies to incorporate them into their future work programs and budgets. Some of the actions require refinement in terms of responsibility, commitment, funding, and/or specificity. Refining these action commitments will be the primary focus of Snohomish County's annual review and updating of this program through a collaborative process with shellfish stakeholders.

For Snohomish County, the scope and authority to develop and implement shellfish protection actions are limited by Snohomish County Code Title 25A. To the extent that actions identified in this program are within the boundaries of the Stillaguamish River Clean Water District and are within the scope of the implementing provisions of Title 25A, Snohomish County can implement them, provided funding is available. Actions outside of the Clean Water District or within the realm of fisheries co-management are the responsibility of other counties, state government, tribes, special districts, and/or private entities. This program will serve in part to coordinate Snohomish County's actions with the shellfish protection actions of other organizations.

The goals, objectives, and actions that comprise the Stillaguamish Shellfish Protection Program are listed for quick reference in the index below and are presented in more detail in a table following the index.

Index of Goals, Objectives, and Actions

Action 1.1.4 – Expand Port Susan marine water quality monitoring to include the area between Warm Beach and Kayak Point for shellfish classification

Objective 1.2 – Ensure that onsite septic systems (OSS) are not contributing to bacterial pollution in streams, lakes, and marine waters

Action 1.2.1 – Continue OSS permitting program

Action 1.2.2 – Respond to complaints about failing OSS and ensure repairs are implemented in a timely manner

Action 1.2.3 – Identify illicit septic connections and failing septic systems

Action 1.2.4 – Develop an education and outreach program to encourage proper operation and maintenance of OSS

Action 1.2.5 – Incorporate OSS education and outreach into Snohomish County MRC's 2010 shoreline residents' workshops

Action 1.2.6 – Maintain information on SHD Wastewater Program web site for OSS maintenance and repair

Action 1.2.7 – Explore opportunities to provide low interest loans for OSS repairs

Action 1.2.8 – Maintain Snohomish County Housing Authority low interest OSS loan program

Action 1.2.9 – Train field staff to identify failing onsite septic systems and illicit connections

Action 1.2.10 – Continue to review new water quality data, shellfish classification status, and OSS performance data to determine if establishment of a Marine Recovery Area is warranted

Action 1.2.11 – Verify that OSS systems are compliant with operation and maintenance guidelines at time of property transfer/sale

Action 1.2.12 – Conduct infrared imagery analysis to identify failing OSS in the Church Creek subbasin

Objective 1.3 – Reduce bacterial pollution from recreational areas

Action 1.3.1 – Evaluate scope of the bacterial pollution problem from recreational areas

Action 1.3.2 – Coordinate with agencies and jurisdictions to address bacterial pollution issues at recreational areas

Objective 1.4 – Maintain and improve wastewater treatment and wastewater conveyance systems

Action 1.4.1 – Re-evaluate WWTPs every 5 years as part of the National Pollution Discharge Elimination System (NPDES) waste discharge permitting process

Action 1.4.2 – Evaluate and ensure adequate maintenance and repair of sewage collection systems

Objective 1.5 – Reduce bacterial pollution associated with livestock waste

Action 1.5.1 – Continue to develop and implement farm plans in high priority areas that consistently violate fecal coliform water quality standards

Action 1.5.2 – Focus Washington Department of Ecology grant funded water quality projects in areas of high livestock concentrations

Action 1.5.3 – Develop and implement a proactive program to contact small farm owners and assist in developing BMPs

Action 1.5.4 – Enforce state and local regulations prohibiting livestock pollution to both surface waters and municipal separate storm sewer systems

Action 1.5.5 – Continue inspections of licensed dairy farms

Objective 1.6 – Reduce bacterial pollution from pet waste

Action 1.6.1 – Utilize and share pet waste education materials developed by Snohomish County Pet Waste Management Program

Action 1.6.2 – Evaluate the need for any additional pet waste management stations in public recreation areas and install/maintain these stations where they are needed

Action 1.6.3 – Inspect and provide technical assistance to commercial kennels that discharge stormwater to storm sewer systems

Objective 1.7 – Improve municipal stormwater pollution control

Action 1.7.1 – Implement NPDES municipal stormwater permit requirements

Action 1.7.2 – Evaluate and implement stormwater treatment retrofit opportunities in the more urbanized areas of the Stillaguamish watershed

Action 1.7.3 – Analyze existing water quality data from stormwater and drainage outfalls that discharge into Hatt Slough, Stillaguamish Old Channel, Port Susan, and South Skagit Bay

GOAL 2 – Foster Self-Sustaining and Harvestable Populations of Shellfish

Objective 2.1 – Assess existing shellfish populations/species

Action 2.1.1 – Conduct Port Susan shellfish suitability index analysis and produce shellfish stock report

Action 2.1.2 – Track varnish clam populations in Port Susan

Action 2.1.3 – Continue to monitor native little neck clam population at Kayak Point

Objective 2.2 – Identify shellfish harvest potential and shellfish harvest stakeholders

Action 2.2.1 – Assess shellfish harvest potential in Port Susan

Action 2.2.2 – Identify shellfish harvest stakeholders

Objective 2.3 – Enhance shellfish populations

Action 2.3.1 – TBD (e.g., plant littleneck clam seed at Kayak Point)

GOAL 3 – Raise Public Awareness about Status and Trends of Water Quality and Shellfish

Objective 3.1 – Public outreach

Action 3.1.1 – Develop agreements with local newspapers for quarterly updates on water quality in targeted areas, areas where improvement is needed, and successful projects and players.

Action 3.1.2 – Partner with KSER Everett community radio station to produce *Sound Living* program focused on CWD shellfish protection

Action 3.1.3 – Develop web page to communicate water quality and shellfish classification status and trends

Action 3.1.4 – Integrate CWD shellfish protection program with Puget Sound Action Agenda

Action 3.1.5 – Represent CWD in Port Susan Marine Stewardship Area project

Action 3.1.6 – Administer CWD Discretionary Fund for implementation of water quality protection projects with landowners

Action 3.1.7 – Provide more educational outreach for livestock bacterial pollution control

Objective 3.2 – Reconnect the community to the shellfish resource

Action 3.2.1 – Collect historical information on tribal, commercial, and recreational shellfish harvesting areas; identify the players and tell their stories

Action 3.2.2 – Request tribal and/or commercial shellfish harvesters to donate product for an annual outreach event featuring locally grown food

Action 3.2.3 – Request tribal and/or commercial shellfish harvesters to conduct tours of operations for CWD Advisory Board and interested parties

Action 3.2.4 – Invite shellfish aquaculture experts to give presentations on community shellfish gardens to Warm Beach/Kayak Point shoreline residents

Goal 4 – Adaptively Manage Work Programs to Achieve Shellfish Protection Goals

Objective 4.1 – Annual review and update

Action 4.1.1 – Conduct annual review and update of this shellfish program with stakeholders

Objective 4.2 – Annual reporting

Action 4.2.1 – Submit annual reports to Washington Department of Health regarding status of Snohomish County's CWD shellfish protection program and expenditure of CWD shellfish revenues

Table of Goals, Objectives, and Actions with Implementation Status Notes

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
GOAL 1 – Reduce Bacterial Pollution					
Objective 1.1 – Identify and monitor bacterial pollution sources					
Action 1.1.1 – Continue marine water quality monitoring in South Skagit Bay and Port Susan and assess conditions for commercial, tribal, and recreational shellfish harvest	High priority (PSI). Performance measure: Acres of commercial shellfish growing area upgraded.	South Skagit Bay commercial shellfish growing area expanded by 815 acres to 2,200 acres Approved status in 2009. Port Susan commercial shellfish growing area upgraded to 1,800 acres Approved status 4/2/10.	WDOH, Stillaguamish Tribe, Tulalip Tribes	Stillaguamish Tribe Cost estimates, existing funding sources, and funding needs TBD. Tulalip Tribes Cost estimates, existing funding sources, and funding needs TBD. WDOH Cost estimates, existing funding sources, and funding needs TBD. Potential funding source: EPA Puget Sound 2010 grant program	WDOH continues to conduct monthly marine water quality monitoring in South Skagit Bay. Stillaguamish Tribe continues Port Susan commercial shellfish growing area monitoring. Tulalip Tribes started marine water quality sampling at two stations in the Warm Beach to Kayak Point area of Port Susan for future shellfish classification review by WDOH.
Action 1.1.2 – Continue freshwater quality monitoring in the Stillaguamish watershed	High priority. Performance measure: Progress toward TMDL fecal coliform targets.	Snohomish County SWM, WDOE, and WBCC continue to collect monthly fecal coliform WQ samples. Stillaguamish Tribe fecal coliform WQ sampling quarterly. Need additional targeted WQ monitoring in Flood Control District and	Snohomish County, WDOE, Stillaguamish Tribe, WBCC	Snohomish County SWM * $33,101 for WQ monitoring and $25,000 for WQ data synthesis by consultant from CWD shellfish revenue (SWM 2010 budget) WDOE Cost estimates, existing funding sources, and	Snohomish County Replaced ambient WQ monitoring program w/ new “long-term water quality monitoring program”, which is focused on fecal coliform TMDL monitoring and source identification. Will begin implementing “contaminant source

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
		Stanwood. Snohomish County requested funding for these WQ monitoring needs in EPA Puget Sound grant proposal, but it was not approved.		funding needs TBD. <u>WBCC</u> Cost estimates, existing funding sources, and funding needs TBD. <u>Stillaguamish Tribe</u> Cost estimates, existing funding sources, and funding needs TBD. Potential funding source: WDOE Water Quality Grant Program for State FY2012.	survey" approach as pilot training project in CWD w/ WQ data synthesis in 2010 and field work in 2011. <u>WDOE</u> Long-term monthly fecal coliform monitoring at 5 stations. Preparing for Skagit Bay bacteria loading study. <u>WBCC</u> Monthly fecal coliform monitoring at 6 sites in the Warm Beach Dike Pond area. <u>Stillaguamish Tribe</u> Unknown
Action 1.1.3 – Investigate the potential contribution of fecal coliform originating from migrating snow goose populations	Low priority Performance measure: TBD	No lead agency for this action.	None	Cost estimate and funding needs TBD.	No progress.
Action 1.1.4 – Expand Port Susan marine water quality monitoring to include the area between Warm Beach and Kayak Point for shellfish classification	High priority Performance measure: TBD	Underway	Tulalip Tribes	Cost estimate and funding needs TBD.	Tulalip Tribes started monthly marine water quality sampling at two stations in the Warm Beach to Kayak Point area of Port Susan for future shellfish classification review by WDOH.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
Objective 1.2 – Ensure that onsite septic systems (OSS) are not contributing to bacterial pollution in streams, lakes, and marine waters					
Action 1.2.1 – Continue OSS permitting program	High priority. Performance measure: TBD.	SHD, Environmental Health Division permits OSS design, construction, and upgrades in Snohomish County. Building permits for remodel, repair, and alterations of existing structures trigger OSS inspection and repair if necessary.	SHD	* Cost estimate: TBD. Funding sources: OSS application and permit fees, building clearance review fees, and other land use fees.	TBD
Action 1.2.2 – Respond to complaints about failing OSS and ensure repairs are implemented	High priority. (TMDL) Performance measure?	SHD has ongoing program to respond to reported OSS failures and ensure repairs are implemented.	SHD	* Cost estimate: TBD. Funding sources: OSS application and permit fees, building clearance review fees, and other land use fees.	OSS related water quality complaints received by Snohomish County are referred to SHD for resolution.
Action 1.2.3 – Identify illicit septic connections and failing septic systems	High priority. (TMDL) Performance measure: TBD.	Identifying illicit septic connections is part of Snohomish County's IDDE element of the NPDES Phase 1 permit. SHD completed Warm Beach on-site sewage system sanitary survey in June 2009. Effectiveness of IDDE and OSS sanitary surveys for identifying illicit septic connections and failing OSS?	Snohomish County, SHD	* $137,000 WMA county-wide, $23,000 CWD shellfish revenue for IDDE in CWD * $25,000 CWD shellfish revenue to SHD for OSS sanitary survey in Church Creek subbasin (2010 SWM budget)	SHD to conduct OSS sanitary survey in Church Creek subbasin in fall of 2010.
Action 1.2.4 – Develop an outreach and education program to encourage proper operation and	High priority. (TMDL) Performance	Snohomish County Septic Program is being implemented by Snohomish County	Snohomish County	• * $51,163 county-wide, $8,632 CWD shellfish revenue (SWM 2010 budget)	Planning to send mailers and conduct 2 workshops in September 2010

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
maintenance of OSS	measure: TBD.	SWM w/ SHD. See Appendix G for summary. Includes pilot program to test effectiveness of OSS education mailers and workshops. Workshops completed.		• * $127,100 WDOE Centennial Clean Water grant (SWM 2010 budget)	targeting ~200 OSS landowners in Church Creek subbasin. Behavior change evaluation to be done Spring 2011.
Action 1.2.5 – Incorporate OSS education and outreach into Snohomish County MRC's shoreline residents' workshops	Medium priority. Performance measure: TBD.	OSS outreach and education has been part of Sno. Co. MRC's shoreline residents' workshops for several years. These workshops are organized by Snohomish County WSU Beachwatchers with funding.	Snohomish County MRC	* $7,672 CWD shellfish revenue (SWM 2010 budget)	OSS was part of the 2/6/10 Stillaguamish shoreline residents' workshop in Stanwood.
Action 1.2.6 – Maintain information on SHD Wastewater Program web site for OSS maintenance and repair	Medium priority. Performance measure: TBD.	TBD	SHD	* Cost estimate: TBD. Funding sources: TBD.	TBD
Action 1.2.7 – Explore opportunities to provide low interest loans for OSS repairs	Medium priority. (TMDL) Performance measure?	Snohomish County evaluated this idea shortly after it created the CWD, but found that the County financial system could not effectively operate like a bank to administer a loan program.	Snohomish County	Cost estimate: TBD. Potential funding sources: Centennial Clean Water Fund (Ecology), EPA Puget Sound Watershed Management Assistance Grant, CWD shellfish revenue	The State proposed approx. $5M for Clean Water grants and/or loans to jurisdictions throughout the state for OSS repairs in 2010. Snohomish County and SHD are exploring how these programs are being implemented in other jurisdictions and will consider feasibility

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
					of seeking funding to apply a similar model in Snohomish County. ShoreBank is implementing OSS repair loan programs in Hood Canal and Willapa Bay and contacted Snohomish County in 2009.
Action 1.2.8 – Maintain Snohomish County Housing Authority low interest OSS loan program	Medium priority. Performance measure: TBD.	Check w/ SCHA	Snohomish County Housing Authority	* Cost estimate: TBD. Funding sources: TBD.	The Snohomish County Housing Authority has an existing low interest loan program to help moderately-low income residents (family of two with less than $46,000 income) to finance septic system repairs.
Action 1.2.9 – Train field staff to identify failing onsite septic systems and illicit connections	Low priority. (TMDL) Performance measure: TBD.	Sno. Co. SWM has developed training materials and conducted training for Sno. Co. field staff. Training materials could be shared with partners.	Snohomish County	Cost estimate: TBD. Funding sources: TBD.	Sno. Co. SWM developed water quality complaint investigation brochure in 2010. This brochure is available for distribution to partners. Water quality complaint investigation web site is also available.
Action 1.2.10 – Continue to review new water quality data, shellfish classification status, and OSS performance data to determine if establishment of a Marine Recovery Area is warranted	Medium priority. Performance measure?	In its 2007 Snohomish County OSS Management Plan, the SHD concluded that no areas in Snohomish County met the criteria for establishing Marine Recovery Areas.	SHD	Cost estimate: TBD. Funding sources: TBD.	TBD

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
		However, the SHD also committed to review this as necessary in the future.			
Action 1.2.11 – Verify that OSS systems are compliant with operation and maintenance guidelines at time of property transfer/sale	Medium priority. (PSI) Performance measure?	SHD is exploring development of "point of sale" inspection program rule with stakeholders in 2010. If implemented, this will be similar to the "Report of System Status" at time of property transfer, which has been implemented in Pierce and Whatcom counties.	SHD	Cost estimate: TBD Funding sources: TBD	TBD
Action 1.2.12 – Conduct infrared imagery analysis to identify failing OSS in the Church Creek subbasin	Medium priority. Performance measures: Imagery analysis completed	Could help supplement SHD's OSS survey work in Church Creek.	Snohomish County	Cost estimate: $25,000 (SWM 2011 proposed budget)	Tentatively proposed for SWM 2011 work program and budget.
Objective 1.3 – Reduce bacterial pollution from recreational areas					
Action 1.3.1 – Evaluate scope of the bacterial pollution problem from recreational areas	Medium priority. Performance measure: Rapid assessment of the problem to be completed in 2011.	State budget cuts limit capacity of WDFW to maintain portable toilets at state-owned public access sites. Existing WDFW portable toilet at Hatt Slough boat launch is difficult to maintain.	Snohomish County and WDFW	Cost estimate: TBD. Funding sources: Snohomish County CWD shellfish protection revenue.	Snohomish County developing field methods for rapid assessment of fecal waste and trash at public access areas in CWD. Implementation targeted for peak recreation season in summer 2011.
Action 1.3.2 – Coordinate	Medium priority.	TBD	Snohomish	TBD	Action targeted for

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
with agencies and jurisdictions to address bacterial pollution issues at recreational areas	Performance measure: TBD based on results of evaluation of the scope of the problem.		County		Snohomish County 2011 work program.
Objective 1.4 – Maintain and improve wastewater treatment and wastewater conveyance systems					
Action 1.4.1 – Re-evaluate WWTPs every 5 years as part of the National Pollution Discharge Elimination System (NPDES) waste discharge permitting process	High priority. Performance measure: WWTPs evaluated every 5 years and improvements completed as required	Stanwood, Arlington, and Warm Beach WWTPs have been upgraded over the past two decades. Stanwood WWTP NPDES waste discharge permit includes special requirements for shellfish protection. Warm Beach WWTP NPDES permit was updated in 2009 and fecal coliform limit was reduced substantially.	WDOE	Cost estimate: unknown. Funding source: State budget.	Stanwood and Twin City Foods WWTP NPDES permits will be updated and reviewed in late 2010.
Action 1.4.2 – Evaluate and ensure adequate maintenance and repair of sewage collection systems	Medium priority (TMDL, PSI). Performance measure: TBD.	TBD. Check w/ WDOE, Arlington, and Stanwood.	WDOE	Cost estimate: unknown. Funding sources: unknown.	Arlington
Objective 1.5 – Reduce bacterial pollution associated with livestock waste					
Action 1.5.1 – Continue to develop and implement farm plans in high priority areas that consistently violate fecal coliform water quality standards	High priority (TMDL). Performance measures: • # farm plans	SCD is actively creating farm plans with landowners. Limiting factor has been inadequate funding for implementation of farm	SCD	• *$193,164 CWD shellfish revenue for SCD contract (SWM 2010 budget) • *$40,000 CWD Discretionary Fund	Farm planning is part of the 2010 SCD contract for CWD services and additional cost share made available for BMP implementation. Farm

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
	completed • Farm inventories completed • # of BMPs implemented	plan BMPs. Continuing needs include development and implementation of farm plan BMP effectiveness monitoring and better evaluation of overall scope of work needed for farm planning.		additional support added mid-year for cost share for BMP implementation. • WDOE Centennial Clean Water Fund for Stilly TMDL project [Bobbi will get 2010 DOE grant info for Stilly projects]	inventories will be completed this summer in Warm Beach and Glade Bekken. SCD is contacting high priority farms in Church Creek and Pilchuck Creek subbasins where farm inventories have been completed.
Action 1.5.2 – Focus WDOE grant funded water quality projects in areas of high livestock concentrations	High priority (TMDL). Performance measures: • Increased number of new cooperators • Increased participation of all cooperators in SCD programs	SCD has DOE grant funded projects in Miller Creek and Pilchuck Creek. In 2009 SCD completed farm inventories in Church Creek and Pilchuck Creek. Miller Creek is mostly dairies. DOE grant funds for BMP implementation do not cover cost share on all BMPs available to landowners through SCD. Continue coordination with DOE on future grant applications.	WDOE	SCD's WDOE grant-funded projects: • Stilly TMDL 2010 ~$40,000 • Miller/Pilchuck 2010 ~$50,000 (for 1.5.2 water quality monitoring ~$10,000 • LID 2010 ~$77,000	SCD is working on WDOE grant projects in Miller Creek and Pilchuck Creek for water quality monitoring, farm plan development, and cost-share for implementation. SCD conducting 2010 farm inventories in Warm Beach and Glade Bekken subbasins.
Action 1.5.3 – Develop and implement a proactive program to contact small farm owners and assist in developing BMPs	High priority (PSI). Performance measures: • # of high priority farms cooperating	SCD is identifying high priority farms through farm inventories. SCD will contact high priority farms to offer farm planning, technical assistance, and cost share for BMP	SCD	SCD contract $ DOE stilly TMDL grant$	SCD expects to have additional farm planning staff by mid-July 2010.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
	with SCD • # of BMPs implemented on high priority farms	implementation. Need additional staffing for farm planning and inventory follow-up.; need to better evaluate scope of problem for entire watershed			
Action 1.5.4 – Enforce state and local regulations prohibiting livestock pollution to both surface waters and municipal separate storm sewer systems (MS4s)	High priority. Performance measures: • DOE hires additional staff for livestock inspections • # of open code violation cases	Snohomish County water quality complaint investigation program responds effectively to livestock pollution complaints. WDOE has done some limited field surveys. WSDA handles any livestock pollution related to commercial dairies. Livestock operators are referred to SCD for technical assistance and voluntary compliance. WDOE does not have livestock inspection program in Stilly due to state budget cuts. Need continued outreach to livestock owners for exclusion from streams and MS4s.	WDOE, WSDA, Snohomish County	<u>Snohomish County</u> * $170,760 county-wide, $28,809 CWD shellfish revenue (SWM 2010 budget) <u>WDOE</u> Needs ~$25K/year for 0.25 FTE livestock inspector to cover Stilly. <u>WSDA</u> Cost estimate: unknown. Funding source: State budget.	WDOE, WSDA, Snohomish County, and SCD are coordinating to achieve compliance.
Action 1.5.5 – Continue inspections of licensed dairy farms	High priority. Performance measures: • # of dairies	Need WSDA involvement in reviewing lower Stilly water quality data. WSDA partnership with	Washington Department of Agriculture	*$17,000 for SCD dairy farm plan updates from WCC. *Ongoing funding for WSDA DNMP through	All 20 dairies in the Stillaguamish watershed have approved dairy nutrient management plans. WSDA inspects

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
	passing routine inspections	SCD is resulting in successful referrals for dairy farm plan updates. WSDA will include Stillaguamish dairy manure lagoons in annual lagoon survey, focusing on pre-winter storage and bank integrity.		WA State budget.	commercial dairies every 22 months and responds to dairy-related water quality complaints.
Objective 1.6 – Reduce bacterial pollution from pet waste					
Action 1.6.1 – Utilize and share pet waste education materials developed by the Snohomish County Pet Waste Management Program	Medium Priority (PSI, TMDL) Performance measure: TBD.	Snohomish County SWM is developing pet waste management program for the CWD and needs help from cities to achieve comprehensive watershed coverage.	Snohomish County	Cost estimate: TBD. Funding sources: TBD.	Snohomish County is focusing on unincorporated urban growth areas outside of the CWD.
Action 1.6.2 – Evaluate the need for any additional pet waste management stations in public recreation areas and install/maintain these stations where they are needed	Medium Priority (PSI) Performance measure: TBD.	TBD	Snohomish County; all jurisdictions with public parks	Cost estimate: TBD. Funding sources: TBD.	Scoping for 2011.
Action 1.6.3 – Inspect and provide technical assistance to commercial kennels that discharge storm water to storm sewer systems	Medium Priority (TMDL) Performance measure: TBD.	Business inspections are part of Snohomish County NPDES permit, but not required in CWD.	Snohomish County for unincorporated County; all jurisdictions	Cost estimate: TBD. Funding sources: TBD	Under consideration for limited business inspections in CWD.
Objective 1.7 – Improve municipal stormwater pollution control					
Action 1.7.1 – Implement	High priority.	Snohomish County and	Snohomish	Cost estimate: TBD.	Underway.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
NPDES municipal stormwater permit requirements	Performance measure: TBD.	Phase 2 jurisdictions conduct several permit-related programs that could protect shellfish by preventing or minimizing inputs of sediment, toxic chemicals, and bacteria into Puget Sound.	County, Arlington, Granite Falls, Skagit County	Funding sources: TBD	
Action 1.7.2 – Evaluate and implement stormwater treatment retrofit opportunities in the more urbanized areas of the Stillaguamish watershed	Low priority. Performance measure should be reduced pollutants in stormwater	Snohomish County has an ongoing program to evaluate water quality problems in its drainage system and to design and construct improvements, including retrofitting high-priority stormwater facilities to improve water quality, and using Low Impact Develoment (LID) BMPs to improve water quality in existing drainage systems. SCD has DOE grant funded project to implement LID work in Arlington, Stanwood, and Camano Island areas.	Snohomish County	Funding needed for feasibility and design of Church Creek and Irvine Slough stormwater treatment retrofit facilities is identified in the 2011 SWM 6-year Detailed Improvement Plan.	A Structural Stormwater Controls Program is part of Snohomish County's NPDES Phase 1 permit; in addition, in the tentative 2011 SWM budget, the County is proposing a water quality facility plan for a subbasin in the Stillaguamish watershed., SCD is hiring LID staff.
Action 1.7.3 – Analyze existing water quality data from stormwater and drainage outfalls that discharge into Hatt Slough, Stillaguamish Old Channel,	High priority. Performance measure: TBD.	WQ data is available from Stilly TMDL study, Twin City Foods NPDES waste discharge permit, Stanwood NPDES	Snohomish County	* $15,000 CWD shellfish revenue for WQ data review (SWM 2010 budget)	Snohomish County SWM intends to compile and review existing WQ data for lower Stilly by end of 2010.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
Port Susan, and South Skagit Bay		waste discharge permit, and WBCC. WDOE will cover Old Channel and South Skagit Bay stormwater and drainage outfalls as part of Skagit Bay Bacteria Pollution Loading Study in 2010-2011.			
GOAL 2 – Foster Self-Sustaining and Harvestable Populations of Shellfish					
Objective 2.1 – Assess existing shellfish populations/species					
Action 2.1.1 – Conduct Port Susan shellfish suitability index analysis and produce shellfish stock report	High priority. Performance measure: TBD	Tulalip Tribes preparing for field work in 2011.	Tulalip Tribes	* Cost estimate: unknown. Funding source: Tulalip Tribes.	Tulalip Tribes intend to conduct a shellfish suitability index analysis and produce shellfish stock report and map of suitable habitat and commercially viable species of hardshell and softshell clams for Port Susan area. Initial surveys will be on-reservation; secondary surveys will focus on Kayak Point north to Warm Beach; and third-tier effort will be for the remaining shoreline from Livingston Bay south along Camano Island to the southern extent of the Port Susan.
Action 2.1.2 – Track varnish clam populations in Port	High priority.	Surveys conducted on Tulalip tribal tideland in	Tulalip Tribes	* Cost estimate: unknown. Funding	Tulalip Tribes intend to assess and monitor the

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
Susan	Performance measure: TBD	2009 and 2010 summer seasons.		source: Tulalip Tribes.	population of non-native and invasive varnish clam (Nuttallia obscurata) in Port Susan in 2011.
Action 2.1.3 – Continue to monitor native little neck clam population at Kayak Point	Medium priority. Performance measure: Annual or semi-annual surveys completed.	WDFW and Tulalip Tribes have been monitoring the Kayak Point little neck clam population since 1989. Severe decline in the Kayak Point population was observed in 2001 and the littleneck population has remained at a low density since that time. State budget cuts resulted in WDFW not completing survey in 2010.	Tulalip Tribes, WDFW	* Cost estimate: unknown. Funding sources: WDFW and Tulalip Tribes.	Annual monitoring of Kayak Point little neck clam population by Tulalip Tribes and WDFW to document any changes in species composition and population dynamics over time.
Objective 2.2 – Identify potential users and harvest potential					
Action 2.2.1 – Assess shellfish harvest potential in Port Susan	Medium priority. Performance measure: Shellfish population surveys and estimates completed.	TBD	Tulalip Tribes, WDFW	* Cost estimate: unknown. Funding source: Tulalip Tribes.	Planned for 2011. In decades past, Port Susan has provided shellfish harvest opportunities for Tribal, recreational and commercial users. Beaches in Port Susan were historically used by the Tribes for subsistence harvests as well as by recreational community. Oyster farms and Eastern

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
					Softshell harvests at the north end of Port Susan were once commercial operations prior to the downgrade in water quality. Once suitability index is established, harvest potential can be estimated for different user groups.
Action 2.2.2 – Identify shellfish harvest stakeholders	High priority. Performance measure?	Shellfish harvest stakeholder contacts established w/ Tulalip Tribes, Stillaguamish Tribe, Swinomish Tribe, Upper Skagit Tribe, and WDFW Point Whitney Shellfish Lab. Need to contact non-tribal commercial shellfish harvester operating in South Skagit Bay. Need to inventory tideland owners.	Snohomish County	* Part of $99,706 CWD Advisory Board and Shellfish Protection project (SWM 2010 budget).	Researching shellfish harvest stakeholders, tideland owners, and state/tribal co-management framework for shellfish growing areas adjacent to CWD.
Objective 2.3 – Enhance shellfish populations					
Action 2.3.1 – TBD (e.g., plant littleneck clam seed at Kayak Point)	Medium priority. Performance measure: TBD	TBD	Tulalip Tribes	Cost estimate: TBD. Funding sources: TBD.	Action not yet defined. Target for 2011 annual review and update process.
GOAL 3 – Raise Public Awareness about Status and Trends of Water Quality and Shellfish					
Objective 3.1 – Public outreach					
Action 3.1.1 – Develop agreements with local newspapers for quarterly updates on water quality in targeted areas, areas where	Medium priority. (PSI) Performance measure: TBD	Not tried yet.	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Proposed for SWM 2011 work program and budget.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
improvement is needed, and successful projects and players					
Action 3.1.2 – Partner with KSER Everett community radio station to produce *Sound Living* program focused on CWD shellfish protection	Medium priority. Performance measure:	Not tried yet.	Snohomish County	$2K, part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Proposed for SWM 2011 work program and budget.
Action 3.1.3 – Develop web page to communicate water quality and shellfish classification status and trends	High priority. Performance measure:	CWD Advisory Board web site is being regularly updated and could be expanded.	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Proposed for SWM 2011 work program and budget.
Action 3.1.4 – Integrate CWD shellfish protection program with Puget Sound Action Agenda	Medium priority. Performance measure:	SWM staff is already participating in the Whidbey Action Area Integration process.	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Proposed for SWM 2011 work program and budget.
Action 3.1.5 – Represent CWD in Port Susan Marine Stewardship Area project	Medium priority. Performance measure:	SWM staff is already participating in the Port Susan MSA project.	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Proposed for SWM 2011 work program and budget.
Action 3.1.6 – Administer CWD Discretionary Fund for implementation of water quality protection projects with landowners	High priority. Performance measure: Projects completed.	CWD Discretionary Fund guidelines and application were updated based on input from CWD Advisory Board and posted on CWD web site.	Snohomish County	*$43,234 from CWD shellfish revenue (SWM 2010 budget). Will be about $50K in SWM 2011 budget.	$35K allocated to SCD from 2010 CWD Discretionary Fund for increased cost share of farm BMPs in Church Creek subbasin. Approx. $8K available for other projects in 2010 and $200K in 2011.
Action 3.1.7 – Provide more educational outreach for	Medium priority (PSI).	Participation by cooperators w/ SCD	SCD	*$59,500 for CWD outreach from SCD	SCD education plan has been completed for

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
livestock bacterial pollution control	Performance measure: Increased participation in SCD outreach events # of new cooperators resulting from outreach.	continues to expand. What's working: effective outreach, increased participation in workshops. What's not: Having difficulty in reaching "all types of demographics" and finding where people glean their information from (websites, adds, social media, libraries, etc).		contract	2010 summer and full outreach season. Workshops completed
Objective 3.2 – Reconnect the community to the shellfish resource					
Action 3.2.1 – Collect historical information on tribal, commercial, and recreational shellfish harvesting areas; identify the players and tell their stories	Low Priority Performance measure: TBD.	Not tried yet.	Snohomish County WSU Beach Watchers, or tribes	$2K, could be part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 tentatively proposed budget)	Could be proposed for SWM 2011 work program and budget.
Action 3.2.2 – Request tribal and/or commercial shellfish harvesters to donate product for an annual outreach event featuring locally grown food	Low Priority Performance measure: TBD.	Not tried yet.	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 tentatively proposed budget)	Tentatively proposed for SWM 2011 work program and budget. Discussions underway w/ Tulalip Tribes, Boettner Tideland Manager, Flood Control District, and Snohomish County Agriculture Coordinator.
Action 3.2.3 – Request tribal and/or commercial shellfish harvesters to conduct tours of operations for CWD Advisory Board	Low priority. Performance measure: TBD	Not tried yet.	Snohomish County	Could be part of part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 tentatively	Could be proposed for SWM 2011 work program and budget.

Recommended Action	Priority and Performance Measure	What Is Working, What Is Not Working, and Where We Need Help	Lead Agency	Cost Estimate and Funding Sources * Already Funded	Status June 2010
and interested parties.				proposed budget)	
Action 3.2.4 – Invite shellfish aquaculture experts to give presentations on community shellfish gardens to Warm Beach/Kayak Point shoreline residents	Low priority. Performance measure: TBD.	Need to identify shellfish aquaculture experts familiar with community shellfish gardens.	Snohomish County, WSU Beach Watchers, or tribes	Could be part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Could be done as part of SWM 2011 shellfish protection work program.
Goal 4 – Adaptively Manage Work Programs to Achieve Shellfish Protection Goals					
Objective 4.1 – Annual review and update					
Action 4.1.1 – Conduct annual review and update of this shellfish program with stakeholders	High priority. Performance measure: Annual review and update completed each year with stakeholders.	TBD	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Part of Snohomish County's CWD annual work program.
Objective 4.2 – Annual reporting					
Action 4.2.1 – Submit annual reports to Washington Department of Health regarding status of Snohomish County's CWD shellfish protection program and expenditure of CWD shellfish revenues	High priority. Performance measure: Annual report submitted to WDOH by July 1 of each year.	TBD	Snohomish County	Part of Shellfish Protection project funded by CWD shellfish revenue (SWM 2011 proposed budget)	Part of CWD annual work program as required by RCW 90.72.

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Appendix A: Washington Department of Health – Shellfish Licensing, Certification, and Classification

Commercial Licensing and Certification

A variety of species are harvested commercially in Washington's Puget Sound and coastal regions, including oysters, clams, mussels, geoduck, and scallops. Since these species are filter feeders capable of concentrating chemicals, bacteria, viruses, or marine biotoxins, an ongoing evaluation of commercial shellfish growing areas, certified harvest sites, and licensed facilities is essential to protect the shellfish-consuming public.

There are three major types of commercial shellfish operators:

- *Harvesters*, who harvest shellstock (live, unshucked product) and sell only to other licensed Washington state shellfish dealers;
- *Shellstock Shippers*, who grow and harvest shellstock, and buy and sell in or outside Washington; and
- *Shucker-Packers*, whose activities may include those of harvesters and shellstock shippers, plus shucking product for packing in jars or similar containers.

Commercial shellfish operations are licensed for a period of one year, and licenses must be renewed annually. All operations must meet stringent state and federal sanitation standards, and are regularly inspected by the Department of Health.

Classification of Shellfish Growing Areas

Classification of all commercial shellfish growing areas in Washington is the responsibility of the Washington Department of Health, Office of Shellfish and Water Protection. Each commercially harvested growing area is assigned a “classification” according to the results of its evaluation. Commercial growing areas may be classified as follows:

- *Approved* – the area is not subject to contamination that presents an actual or potential public health hazard. An Approved classification authorizes commercial shellfish harvest for direct marketing.
- *Conditionally Approved* – the area meets Approved criteria, but only during predictable periods. For example, during dry weather a growing area may meet Approved water quality standards, but after a certain amount of rain falls the water quality declines. In this example, the Conditionally Approved area is temporarily closed to harvest after a rainfall event. The length of closure is predetermined for each Conditionally Approved area, and is based on water sample data that show the amount of time it takes for water quality to recover and again meet Approved criteria. Once that time period has elapsed, the area is reopened.
- *Restricted* – the area does not meet water quality standards for an Approved classification, but the sanitary survey indicates only a limited degree of pollution from non-human sources. Shellfish harvested from Restricted growing areas

cannot be marketed directly. They must be “relayed” to Approved growing area waters for a specified amount of time, allowing shellfish to naturally cleanse themselves of contaminates before they are harvested for market.

- *Prohibited* – the area has fecal material, pathogenic microorganisms, or poisonous or harmful substances may be present in concentrations that pose a health risk to shellfish consumers. Growing areas adjacent to sewage treatment plant outfalls, marinas, and other persistent or unpredictable pollution sources are classified as Prohibited. Growing areas that have not undergone a sanitary survey are also classified as Prohibited. Commercial shellfish harvests are not allowed from Prohibited areas.

A growing area's classification is determined through a three-fold process consisting of the following evaluative parts:

1. A shoreline survey, which identifies upland pollution sources that may impact water quality. The program evaluates sewage treatment plants, onsite sewage systems, animal farms, drainage ways, wildlife, and any other potential impact to the growing area;
2. Marine water sampling to determine if fecal coliform bacteria levels in the marine water meet harvestable standards; and
3. Analysis of how weather conditions, tides, currents, and other factors may affect the distribution of pollutants in the area.

Boundary lines, referred to as *sanitary lines*, may be established to define the boundaries of shellfish area closure zones or to distinguish different classifications within a shellfish area. The establishment of a sanitary line is based on the combined information derived from the pollution source, hydrographic, and water quality evaluations.

Appendix B: Port Susan Shellfish Reclassification Request from the Stillaguamish Tribe to Washington Department of Health.

Stillaguamish Tribe

Natural Resources Department

March 15, 2007

Bob Woolrich
Washington State Department of Health
111 Israel Road S.E
Tumwater, WA 98501
360.236.3329 – Telephone
360.236.2257 - Fax

RE: Stillaguamish Tribe Request for Reclassification of Marine Waters in Northern Port Susan, Washington

Mr. Woolrich,

The Stillaguamish Tribe would like to request an evaluation of Port Susan for the purposes of reclassification of shellfish harvest areas. The shellfish growing area in Port Susan is currently unclassified.

A Summary of Marine Water Data (SRS), conducted by your department, indicates at least 30 samples have been evaluated between 12/18/2003 and 3/15/2007. The SRS shows four of the shellfish harvest areas pass the fecal coliform geometric mean and 90th percentile requirements to meet the Standard (NNSP)

Would you please include a TOPO map showing our stations that pass as well as a data set for the fecal coliforms/100 mL.

Sincerely,

Shawn Yanity
Chairman: Stillaguamish Tribe
PO Box 277
3310 Smokey Point Drive
Arlington, WA 98223
360-652-7362 ext 228
425-359-7922 cell
360-659-3113 fax

22712 6th Avenue NE
360 435 2755

Arlington WA 98223
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PO Box 277
Scan: 425 257 1628

Appendix C: South Skagit Bay 2010 Early Warning System Summary Report to Snohomish County

Washington State Department of Health
2010 Early Warning System Summary for
Shellfish Growing Areas in Snohomish County

Washington State Department of Health

The Department of Health (DOH) places shellfish growing areas in a "Threatened" or "Concerned" status based on our assessment of threats to the growing area's classification. This assessment is currently based on the identification of pollution sources that may impact public health, and/or how close a water sampling station's bacteria levels are to the National Shellfish Sanitation Program's (NSSP) standards. The latter has been the most common and is described below.

The NSSP prescribes two methods to evaluate fecal coliform levels at water sampling stations to classify growing areas: Systematic Random Sampling (SRS) and Adverse Pollution Conditions (APC). Both use a minimum of the last 30 samples. With the SRS method, the 90th percentile cannot exceed 43 fc/100mL. With the APC method, no more than 10% of the samples can exceed 43 fc/100mL. If any of these standards are exceeded, no shellfish can be directly harvested from the area of that station.

A Threatened status is assigned in SRS growing areas when a water sampling station's 90th percentile is between 30 and 43 fc/100mL. In APC growing areas, a Threatened status is assigned if more than 6.0% of the samples have exceeded 43 fc/100mL.

A Concerned status is assigned where a water sampling station's 90th percentile is greater than 20, but less than 30. The DOH is providing this information to county governments so that corrective actions can take place before water quality at the listed stations fails the shellfish standards.

SOUTH SKAGIT BAY GROWING AREA

Station Number 192	Threatened due to water quality
Station Number 183	Concerns due to water quality
Station Number 184	Concerns due to water quality
Station Number 185	Concerns due to water quality
Station Number 186	Concerns due to water quality

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Appendix D: Washington State Bacterial Water Quality Standards

As a guide for managing marine and fresh water quality, the Washington Department of Ecology has developed a number of categories of water bodies and fecal coliform criteria that must be met to protect public health. These are shown in the following table.

Washington State Water Quality Fecal Coliform Criteria.[10]

Water Contact Category	Geometric Mean Requirement	90th Percentile Requirement
Marine Water Shellfish Harvesting	14 MPN/100mL	43 MPN/100mL
Freshwater Extraordinary Contact	50 cfu/100mL	100 cfu/100mL
Freshwater Primary Contact	100 cfu/100mL	200 cfu/100mL

Geometric Mean Requirement refers to a statistical average derived from the number of actual fecal coliform colonies contained in all of the water samples collected.

90th Percentile Requirement states that no more than 10% of the samples can exceed the upper limit.

MPN means “most probable number”. This is a specific method of fecal coliform analysis. Results are expressed as number of colony forming units per 100 mL of sample.

CFU means “colony forming units”. It refers to the number of bacteria colonies that grow in a Petri dish after 100 milliliters (mL) of stream water is filtered and tested on the dish. 100 mL is almost half a cup (0.42 cups to be more exact).

Extraordinary primary contact refers to waters providing extraordinary protection against waterborne diseases (as in consumption) or that serve as tributaries to extraordinary shellfish harvesting areas.

Primary contact recreation refers to activities where a person may be completely submerged in water such as swimming or diving.

[10] Adapted from WAC 173-201A Water quality standards for surface waters of the state of Washington

Appendix E: Detailed History of Shellfish Protection in the Stillaguamish River Clean Water District

1968: The Washington Department of Health closed one third of the tidelands in Port Susan to commercial shellfish harvesting due to bacterial contamination of marine waters and high fecal coliform counts in the meats of eastern soft-shell clams.

1987: Port Susan Downgraded from Approved to Restricted: The Washington State Department of Health completed the Water Quality Study of Port Susan in 1987 (Lukes 1987), which resulted in an extensive downgrade (11,900 acres) of the commercial growing area from Juniper Beach (just west of Stanwood in Island County) southward to Warm Beach.

1987-1990: Snohomish County Public Works, Tulalip Tribes, and many other stakeholders developed the Stillaguamish Watershed Action Plan in response to shellfish closure due to fecal pollution. They determined that four sources were the major contributors to decreased water quality:

1. Agricultural practices (major bacterial contributor)
2. OSS (major bacterial contributor in Warm Beach area)
3. Development and urban runoff (major sediment contributor)
4. Forest practices (primary sediment contributor)

1990-1993: Water quality monitoring revealed fecal coliform levels in and around Port Susan that exceed DOE health standards.

1990-1993: Multiple agencies coordinated efforts to reduce sources and levels of pollution including:

- SCD focused on livestock bacterial pollution source control through public education, monitoring and implementation of BMPs.
- SHD focused on OSS bacterial pollution source identification and control in the Warm Beach area.
- Broad-based monitoring efforts established by DOE, SWM and Stillaguamish Tribe.

1993: Snohomish County created the Stillaguamish CWD with a broad set of goals for the lower Stillaguamish River, including:

- Assistance for farm plan implementation
- Loan program for OSS repair or replacement
- Watershed steward for coordination of agencies and plans
- Protection and restoration of fish habitat
- Reopen shellfish beds for commercial and recreational harvest

1994-2000: In response to water quality issues, DOE, SWM, SHD, SCD and local tribes worked to identify pollution sources, clean up pollution sources, and support

implementation of Best Management Practices (BMPs), and conduct educational outreach campaigns.

1993-2007: Commercial shellfish harvest remained closed with sporadic open and closed seasons and locations for recreational harvest. Major progress was made in correcting failed septic systems, implementing BMPs, upgrading WWTPs, conducting educational workshops, and establishing community associations focused on health concerns related to poor water quality.

1998: Local tributaries and Port Susan placed on DOE 303d listing of impaired waterbodies. This prompted the development of water quality improvement plans.

2000-2005: Warm Beach residents form neighborhood associations to voice their concerns about poor water quality and implications to public health. They contact SWM to develop a collaborative effort to return water quality in Port Susan and local tributaries to satisfactory levels.

2005: DOE produced a Total Maximum Daily Load (TMDL) Water Cleanup Plan for the Stillaguamish River that compiled historical water quality data, identified sources of fecal pollution, and defined actions necessary to improve water quality.

2005: Snohomish County/Stillaguamish Tribe Warm Beach Sewage Signature Pilot Study, presented to the CWD in 2006. Investigated the sources of fecal coliform originating from the Warm Beach area. The study found no conclusive signatures of sewage in any of the natural or man-made drainage systems sampled, but it was limited in time and space.

2005/2006: Stillaguamish Tribe and Stillaguamish River Flood Control District implemented bacterial pollution source DNA study at Warm Beach.

2006: South Warm Beach Master Drainage Plan summarized Snohomish County's 2001-2005 efforts to identify and remove illicit discharges of sewage from the storm sewer system and waters of the state.

2007: DOE completed the Lower Skagit River Total Maximum Daily Load Water Quality Implementation Plan which compiled historical data, listed implementation activities for identified sources of fecal pollution, and evaluated recent Skagit County monitoring data for the South Fork Skagit River which demonstrated this reach is meeting both state water quality standards and the stricter TMDL standards of 24 cfu/100 mL (geometric mean) and 74 cfu/100 mL (90th percentile). Factors considered most important to the improvements: first, the progress made by City of Mount Vernon Waste Water Treatment Plant in reducing the annual occurrences of Combined Sewer Overflows, and second, a variety of nonpoint educational and compliance programs including the state Dairy Nutrient Management Program and public outreach and education for OSS operation, maintenance and inspections.

2007: DOE produced a Stillaguamish River TMDL Water Quality Implementation Plan detailing recommendations for cleanup, funding options, methods to measure success and the strategy for successfully implementing the cleanup plan.

2007: SWM applied for but did not receive a $300,000 DOE Centennial Grant to fund the Warm Beach Water Quality Cleanup Project.

2007: Snohomish County SWM received a $100,000 Local Government Stormwater Grant to develop a shellfish restoration plan for the Stillaguamish River Clean Water District.

2008: Washington Department of Health, Office of Shellfish and Water Protection began shoreline survey of South Skagit Bay for the purpose of identifying and evaluating all actual and potential sources of water quality contamination to shellfish growing areas.

2008: Snohomish County SWM began long-term monitoring of streams, lakes, wetlands and their buffers to assess the effectiveness the County's critical areas regulations which were adopted in October of 2007.

2009: The Washington Department of Health began a shoreline survey of north Port Susan for the purpose of identifying and evaluating all actual and potential sources of water quality contamination to the shellfish growing area.

2009: SWM applied for but did not receive a $1 million EPA Puget Sound Watershed Management Assistance grant for "Port Susan Water Quality and Shellfish Improvement." The grant proposal defined specific partnership activities with the Stillaguamish River Flood Control District, Snohomish Conservation District, Tulalip Tribes, Stillaguamish Tribe, Island County, WBCC, and The Nature Conservancy.

April 2, 2010: The Washington Department of Health reclassified 1,800 acres of north Port Susan to Approved status.

As of June 2010, fecal coliform monitoring stations remain in place in Port Susan, Warm Beach area streams and numerous locations in the Stillaguamish watershed. Most of Port Susan remains closed for shellfish harvest. Collaborative efforts by various agencies and organizations continue to respond to poor water quality.

Appendix F: What is a Farm Plan?

A farm plan is a tool that is developed by your local Conservation District and you, to help you manage the resources on your land. The plan contains an inventory of your farm or property and outlines actions and a schedule for you to make improvements based on your goals for the property. Once you decide that you want a farm plan, the Conservation District farm planner will evaluate your property's inherent resources such as: soil, water, animals, plants and air quality. You will also receive an aerial photo showing soils, field layout, water sources, and other features. The farm plan, tailored to your operation and your land, will list these types of items:

- farm size
- soil types
- slope of the land
- proximity to streams or water bodies
- type and number of livestock and crops
- your goals and timeline
- available resources (machinery, buildings, etc)

Next, we will address potential water quality concerns and suggest changes in management and potential Best Management Practices (BMP's) that, once installed, would help alleviate impacts to resources on the property. Possible examples can include:

- streamside fencing
- pasture renovation and/or management
- weed control and
- manure management

The farm planner may offer advice on what grasses to plant, fence layout, and soil amendments to use. The suggestions made by the farm planner are reviewed by the landowner and together they develop a plan for accomplishing the changes. Once decisions are made, a tentative implementation schedule is set and the plan written. Engineering, surveying, and cost-share needs will also be evaluated at this time. One copy of the plan is kept with the farmer and one is kept on record with the Conservation District. Revisions of the plan can be made as the goals and needs of the landowner change.

An important point to remember is – you don't have to be a commercial operation to have a farm plan developed for you. The Conservation District works with all sorts and sizes of farms and rural properties, from backyard horse owners to dairy and beef operations! All services provided by the Conservation District are free and without obligation.

The Snohomish Conservation District is tasked with protecting the soil and water of Snohomish County and Camano Island through farm planning, technical assistance and

education. If you would like to access the free services of Snohomish Conservation District, call (425) 335-5634 and ask for a farm planner. For more information, go to: www.snohomishcd.org.

Snohomish Conservation District
528 - 91st Ave NE, Ste A
Lake Stevens, WA 98258

Appendix G: Snohomish County Septic System Program

Summary for the Stillaguamish River Clean Water District Advisory Board – April 23, 2009

Background
Although municipal sewage treatment facilities serve many of the incorporated areas within Snohomish County, more than 70,000 onsite sewage disposal systems (septic systems) serve residences and other facilities within the County. Septic systems offer an effective method of sewage treatment and disposal when properly designed, operated, and maintained. However, when owners fail to properly care for their systems, they can contribute to surface water contamination via discharge of fecal coliform bacteria, soaps, and other contaminants.

Many waterbodies in Snohomish County have been listed by Ecology as impaired due to high levels of bacteria. Fecal coliform levels exceeding the current state standard for Class A waters (100 cfu/100 ml) are well documented in Watershed Action Plans, Watershed Management Plans, and TMDLs, and have persisted for many years in the Stillaguamish River and several tributaries to the lower Snohomish River and Lake Washington.

Source identification studies, using DNA ribotyping of bacteria found in urban Puget Sound streams, consistently show the presence of bacteria from human sources. Methods used in these studies do not allow quantification of the sources, but the consistent presence of human waste in multiple watersheds indicates that failing septic systems are a probable source of bacteria in streams. On average, Surface Water Management (SWM) investigates about 1.5 sewage-related complaints per month (134 since 1996). The Snohomish Health District (SHD) investigates approximately 250 sewage-related complaints per year and reviews a similar number of repair applications.

While this challenge is certainly not unique to Snohomish County – indeed, this is a nationwide concern – it needs to be addressed at a local scale. To address these problems, the Department of Ecology included in its Detailed TMDL Implementation Plan for the Lower Snohomish River Tributaries, recommendations to implement education programs to reduce bacterial contamination.

Septic System Pilot Program Overview
In response to these needs, Snohomish County applied for and received a Centennial Clean Water Fund grant from the Department of Ecology, funding a partnership between the SHD and SWM to develop a model outreach and education program designed to encourage proper operation and maintenance of septic systems to prevent septic-related water quality problems. The results of this pilot program will be used to develop a countywide program in accordance with SWM's NPDES municipal stormwater permit.

SWM, as the project lead, is contributing project administration, GIS skills, education, and monitoring resources. The SHD will provide a part time sanitarian dedicated to working with SWM and others in identifying areas for septic investigations and providing direct assistance to homeowners.

Completed Tasks

- The SHD has entered a formal partnership with Snohomish County Surface Water Management (SWM) on this project through an interlocal agreement.
- The SHD's "Drainfield Awareness and Vital Education" (DAVE) records have been merged with SWM's GIS system.
- SWM and SHD conducted a GIS analysis to identify four priority areas of 200 homes each for intensive outreach. One of the four priority areas is located in the Church Creek subbasin of the Stillaguamish Watershed. Two priority areas are located in the Snohomish Watershed and one in the Lake Washington Watershed.
- Market research has been conducted to inform the development of effective homeowner training and contact strategies including a polling forum of approximately 50 citizens and a 400-household statistically valid telephone survey.
- A rapid ethnographic assessment of septic system service providers has been conducted under an interlocal agreement of Edmonds Community College. Semi-structured interviews were conducted with twenty key informants of the septic service industry. Content from these interviews will inform outreach materials, highlight common system user errors, and facilitate distribution of educational materials via service providers.

Current and Future Tasks

- Outreach materials including mailpieces, brochures, informational handouts, and website content are in development. A market research firm will conduct focus groups to test the effectiveness of those materials.
- All homeowners within the four priority areas (800 households total) will be contacted through an intensive mail campaign that highlights proper maintenance and operation techniques, connects residents with sanitarians for technical assistance, directs residents to online resources, and advertises upcoming workshops.
- A SHD sanitarian will conduct voluntary septic system house calls during which they will provide technical assistance to homeowners.
- "Septic Systems 101" training workshops will be offered to homeowners in the priority areas.
- Online operation and maintenance resources will be made available to homeowners.
- Program effectiveness monitoring will be conducted within priority areas.
- Water quality monitoring will be conducted in two priority areas and two control (sewered) areas to determine if septic system effluent is reaching the stormwater conveyance system.

Schedule
The project extends through December 2010. An extension through July 2011 is pending.

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rom ambient type monitoring programs rather than stormwater sampling. The remaining 2% maybe from any IDDE sample data which discharge to those areas of concern.